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ABSTRACT

This study attempted to examine the organizational structures of elementary schools in terms of complexity, centralization, formalization, stratification, and job satisfaction; and to analyze the relationship of these variables to the adaptiveness of elementary schools. More specifically, it compared the Multiunit School-Elementary (MUS-E) type of school organization with that of the nonMUS-E type. Adaptiveness, or the activities that elementary school staffs carry out to adapt instructional and learning programs to the differences identified among children, was measured with regard to student activities, teacher activities, and individualization. Data were analyzed using multiple stepwise regression techniques with no exclusion or inclusion criteria. While the study did provide evidence that organizational structures were related to organizational adaptiveness, it also revealed that factors in addition to the structural variables were contributing to the adaptiveness of MUS-E schools. In other words, although MUS-E and nonMUS-E schools showed substantially no difference with regard to their organizational structures, MUS-E schools were significantly more adaptive. (Author/DN)

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Technical Report No. 276

THE RELATIONSHIP OF ORGANIZATIONAL STRUCTURE TO ORGANIZATIONAL ADAPTIVENESS IN ELEMENTARY SCHOOLS

Report from the Project on Organization
for Instruction and Administrative Arrangements

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STATEMENT OF FOCUS

Individually Guided Education (IGE) is a new comprehensive system of elementary education. The following components of the IGE system are in varying stages of development and implementation: a new organization for instruction and related administrative arrangements; a model of instructional programing for the individual student; and curriculum components in prereading, reading, mathematics, motivation, and environmental education. The development of other curriculum components, of a system for managing instruction by computer, and of instructional strategies is needed to complete the system. Continuing programmatic research is required to provide a sound knowledge base for the components under development and for improved second generation components. Finally, systematic implementation is essential so that the products will function properly in the IGE schools.

The Center plans and carries out the research, development, and implementation components of its IGE program in this sequence: (1) identify the needs and delimit the component problem area; (2) assess the possible constraints--financial resources and availability of staff; (3) formulate general plans and specific procedures for solving the problems; (4) secure and allocate human and material resources to carry out the plans; (5) provide for effective communication among personnel and efficient management of activities and resources; and (6) evaluate the effectiveness of each activity and its contribution to the total program and correct any difficulties through feedback mechanisms and appropriate management techniques.

A self-renewing system of elementary education is projected in each participating elementary school, i.e., one which is less dependent on external sources for direction and is more responsive to the needs of the children attending each particular school. In the IGE schools, Center-developed and other curriculum products compatible with the Center's instructional programing model will lead to higher morale and job satisfaction among educational personnel. Each developmental product makes its unique contribution to IGE as it is implemented in the schools. The various research components add to the knowledge of Center practitioners, developers, and theorists.

ACKNOWLEDGEMENTS

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ABSTRACT

The purpose of this study was to examine the organizational structures of elementary schools in terms of complexity, centralization, formalization, stratification, and job satisfaction, and to analyze the relationship of these variables to the adaptiveness of elementary schools. A secondary purpose was to compare the Multiunit School-Elementary (MUS-E) type of school organization with non-MUS-E types of school organization. Adaptiveness, defined in terms of the activities elementary school staffs carry out to adapt instructional and learning programs to the differences that may be identified among children, was measured with regard to student activities, teacher activities, and individualization. The latter measure was a combination of the first two. The theoretical framework was based primarily on Hage's axiomatic theory of organizations.

In this study, it was hypothesized that there was no relationship between the properties of organizational structure and organizational adaptiveness. It was further hypothesized that there was no relationship between:

Complexity and adaptiveness;

Centralization and adaptiveness;

Formalization and adaptiveness;

Stratification and adaptiveness;

Instrumental job satisfaction and adaptiveness; and

Expressive job satisfaction and adaptiveness.

The study population consisted of 1,000 MUS-E schools located in 14 states, established under the aegis of the Wisconsin Research and Development Center for Cognitive Learning and a corresponding set of non-MUS-E schools located in the same district. Thirty-eight schools, twenty MUS-E schools and 18 non-MUS-E schools, participated in the study. Data were gathered using a questionnaire distributed to principals and ten randomly selected teachers in each school.

Data were analyzed using multiple stepwise regression techniques with no exclusion or inclusion criteria. Comparisons between the MUS-E schools and the non-MUS-E schools on each of the organizational structures and on adaptiveness were made using univariate analysis of variance, and a comparison of both types of schools on the dependent variable alone was made using a Chi-square formula.

The major findings of the study were as follows:

1. There was a relationship between the properties of organizational structure and organizational adaptiveness.

2. There was a negative relationship between complexity (measured as the number of administrative positions) and adaptiveness (measured as student activities and as individualiation). There was no relationship between complexity (measured as the number of special purpose workshops attended per year) and any of the measures of adaptiveness.

3. There was a relationship between centralization and adaptiveness (measured as student activities and individualization).

4. There was no relationship between formalization and adaptiveness.

5. There was a negative relationship between stratification and adaptiveness.

6. There was no relationship between instrumental job satisfaction and adaptiveness.

7. There was no relationship between expressive job satisfaction and adaptiveness.

8. There were no differences between the two types of schools on complexity, formalization, stratification, and job satisfaction.

9. MUS-E schools had significantly lower centralization than non-MUS-E schools.

10. MUS-E schools were significantly more adaptive than non-MUS-E schools.

While the study provided evidence that organizational structures were related to organizational adaptiveness, it revealed that factor(s) in addition to the structural variables were contributing to the adaptiveness of MUS-E schools. In other words, while MUS-E and non-MUS-E schools were not substantially different with regard to the organizational structures, MUS-E schools were significantly more adaptive. Moreover, when treated as an independent variable, the condition of MUS-E accounted for more of the variance in adaptiveness than any one of the organizational structures.

CHAPTER I

INTRODUCTION

The purpose of this study was to examine the organizational structures of elementary schools in terms of their complexity, centralization, formalization, stratification, and job satisfaction and to analyze the relationship of these variables to the adaptiveness of elementary schools. Adaptiveness was viewed as essentially synonymous with innovation or change. While innovativeness and change in schools have been studied extensively, such study has been conducted primarily from a psychological or social-psychological perspective on organizations. In this study, the approach to studying adaptiveness was from a sociological or structural perspective on organizations. Essentially, adaptiveness was defined in terms of the activities elementary school staffs carry out to adapt instructional and learning programs to the differences that may be identified among or within children.

Review of the Literature

The review of the literature in this chapter presents the theoretical framework which guided the study. First, the discussion will establish the perspective on organizations chosen for the study and then will deal with the concepts of organizational structure and adaptiveness. The theoretical relationship of structure to adaptiveness will then be explored. Finally, operational definitions will be given specific attention with regard to their applicability to elementary school organizations.

Perspectives on Organizations

Organizations have been studied from a number of perspectives. Organizations can be viewed in terms of characteristics of the individuals within the organization (a psychological perspective), or in terms of small groups (a social-psychological perspective), or in terms of social structures (a sociological perspective).

Each perspective raises a different set of questions. Hage and Aiken[1] stated that the psychologist views organizations as aggregates of individuals each with his own abilities, interests, behaviors, and motives. The psychologist is interested in such questions as: What kinds of personalities or behaviors are most appropriate for accomplishing certain tasks? How do patterns of perceptions or thinking influence various processes such as decision making? The focus or major object of study is the individual, not the job. Since the distinction between the individual and the job is not clearly drawn in groups, the social-psychologist, whose interest is behavior in group settings, tends to raise such questions as: Is the right man in the right job? How do characteristics of the organization affect individual patterns of perception and thinking? The sociologist is concerned with jobs or social positions in collection. Thus, sociologists are concerned with such questions as: What are the consequences of particular activities within a single job? What is the nature of the relationship between jobs? In other words, the focus of study is the collectivities of jobs, not individuals.

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[1] Jerald Hage and Michael Aiken, SOCIAL CHANGE IN COMPLEX ORGANIZATIONS (New York: Random House, 1970), p. 123.

The perspective of this study is sociological. Perrow[2] called such a perspective a social-structural view. The definitions of organizations and their related components which will be given represent this point of view. From this perspective, organizations are considered collections of social positions. Therefore, it seems reasonable to argue that collective properties are best explained by other collective properties rather than by psychological or social-psychological properties.[3]

Concepts of Structure and Adaptiveness

Two major concepts, organizational structure and organizational adaptiveness, set the framework for this study. A review of the literature related to both ideas reveals that any definition which may be utilized is to a large extent arbitrary. The field of organizational theory is characterized by numerous approaches, each with its own set of definitions reflecting certain biases. James D. Thompson[4] focused on the environment of the organization. Perrow[5] looked at organizations in terms of their particular technologies. Weber[6] conceptualized organizations with regard to their systems of control from which he described the "ideal" bureaucratic organization. Etzioni[7] considered organizations as social units seeking specific goals. Any one approach with its own set of definitions is likely to ignore some aspect of organizations which another approach considers to be important. Thus, any one set of definitions tends to be limited relative to another set.

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[2] Hage and Aiken, op. cit., pp. 11-12.

[3] Charles Perrow, ORGANIZATIONAL ANALYSIS: A SOCIOLOGICAL VIEW (London: Tavistock Publications, Ltd., 1970), p. 2.

[4] James D. Thompson, ORGANIZATIONS IN ACTION (New York: MacGraw-Hill Book Company, 1967).

A definition must be generated nonetheless in order to provide a focus for discussion and investigation. Both the concept of organizational structure and that of adaptiveness follow from the superordinate concept of organization. Each, in turn, includes subordinate or component concepts. A definition of organization is now provided and definitions of subordinate concepts important to this study will then be presented.

In his book, Organizations: Structure and Process, Hall provided a definition of organization which appears to incorporate most of the major notions suggested by other students of organizations. According to Hall, "An organization is a collectivity with a relatively identifiable boundary, a normative order, authority ranks, communications systems, and membership coordinating systems; this collectivity exists on a relatively continuous basis in an environment and engages in activities that are usually related to a goal or a set of goals."[8] Not all the connotations and implications of this definition were important to the present study. The study was not concerned with questions of organizational boundaries nor the environment of the organization. The study focused on questions of order, authority, communications (in a limited sense), and coordination, particularly as they relate to elementary schools. Another, and perhaps simpler, way of stating these concerns is to describe these ideas as structure and process.

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[5] Perrow, op. cit., pp. 50-89.

[6] H. H. Gerth and C. Wright Mills, from MAX WEBER: A SOCIOLOGICAL VIEW (New York: Oxford University Press, 1946), p. 3.

[7] Amitai Etzioni, MODERN ORGANIZATIONS (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1964), p. 3.

For organizations to function, the interaction of the individual members must be structured. Rules of behavior and expectations of performance are established. If the organizationally defined tasks are to be completed, member activities must be coordinated. Since organizations have varying amounts or degrees of uncertainty to deal with, authority to make decisions must be assigned. Communication systems are also required to keep members informed. Thus, organizations have structures and processes which are necessary if an organization is to function.

Not only must organizations have structure if they are to function, but organizations must also be flexible. The organization's environment changes. For example, a university research laboratory discovers a drug which dramatically reduces a person's susceptibility to the common cold. If a drug manufacturer or retailer wants to remain in business for very long, he must give serious consideration to producing and marketing the new drug. The technology employed by the organization is altered to improve efficiency and effectiveness. The alteration may be so drastic as to require a change in decision-making patterns and authority structures in the organization. A flexible organization can more readily accommodate such a change than can a rigidly structured organization. In other words, a flexible organization is one which is adaptive to changing conditions in the environment, changes in technology, and other factors which may come to bear on the organization.

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[8] Richard H. Hall, ORGANIZATIONS: STRUCTURE AND PROCESS (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1972), p. 9.

The discussion thus far has served to provide a general definition of the concept of organization and the two subordinate concepts of structure and adaptiveness. An organization is a structured and coordinated collectivity of individuals engaged in activities related to a set of goals; the organization may be flexible or rigid in pursuit of those goals. Of concern to this study were the structure of the organization and its relationship to the organization's flexibility or adaptiveness.

Another way of viewing organizational structure and adaptiveness is to consider them in terms of means and ends, respectively. Hage, in his axiomatic theory of organizations proposed just such a view.[9] In his theory, Hage outlined eight variables related to organizations; four of which he called means and four he called ends.

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[9] Jerald Hage, "An Axiomatic Theory of Organizations," ADMINISTRATIVE SCIENCE QUARTERLY, 10 (December, 1965), p. 3.

The means are considered as variables in an organization's structure and the ends represent performance or functioning variables.[10] In Hage's view the means are termed complexity, centralization, formalization, and stratification; the ends are termed adaptiveness, job satisfaction, production, and efficiency.[11] This study was concerned only with the four means and the two ends of adaptiveness and satisfaction.

For these concepts to have value for research, they must be operationally defined. Hage has provided such definitions for organizations generally.

Complexity, according to Hage, refers to the number of occupations or specialties in an organization. Another aspect of complexity is the length of time required to train the person in the specialty. Thus, the greater the number of occupations and the longer the period of training required, the more complex the organization. Structurally, every organization must divide its work into jobs in order to achieve objectives. Thus, an integral component of an organization's structure is the way in which the work is divided into specific jobs or tasks. Pugh, et al., referred to a similar concept except that they called it specialization. They defined it thusly: "Specialization refers to the division of labor within the organization . . ."[12]

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[10] Hage and Aiken, op. cit., p. 28.

[11] Hage, op. cit., p. 293.

[12] D. S. Pugh, et al., "A Conceptual Scheme for Organizational Analysis," ADMINISTRATIVE SCIENCE QUARTERLY, 8 (December, 1963), p. 301.

Price stated that, "Complexity may be defined as the degree of knowledge required to produce the output of a system. The higher the education, the higher the complexity."[13]

Centralization refers to the distribution of power to make decisions about the allocation of resources. Generally such decisions have policy implications. It is true that every actor in an organization has to make decisions. But not all members can participate in decisions which the organization, for whatever reason, considers to be in some sense "important." According to Hage, some organizations allocate power to only a few jobs, while other organizations allow much wider participation. Thus, "centralization, or hierarchy of authority, is measured by the proportion of occupations or jobs whose occupants participate in decision making and the number of areas in which they participate. The lower the proportion of occupations or jobs whose occupants participate and the fewer the decision areas in which they participate, the more centralized the organization."[14] Hall similarly considered the matter of power or authority in decision making and the way authority is distributed in the organization as centralization.[15]

Every organization has rules. Rules which guide behavior and decisions are necessary to guide operations and provide predictability.

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[13] James L. Price, ORGANIZATIONAL EFFECTIVENESS: AN INVENTORY OF PROPOSITIONS (Homewood, Illinois: Richard D. Irwin, Inc., 1968), p. 26.

[14] Hage, op. cit., pp. 294-295.

[15] Hall, op. cit., p. 117.

Rules make coordination of effort efficient but they may also lead to rigidity. Some rules are written; others exist in the tradition of the organization as unwritten customs. Either way, they may be strictly enforced or they may be loosely observed. In other words, "Some organizations carefully codify each job, describing the specific details, and then ensure conformity to the job prescription. Other organizations have loosely defined jobs and do not carefully control work behavior."[16] The degree to which jobs are codified and the range of variation or latitude tolerated within the rules, is called formalization. Hall[17] referred to formalization in essentially the same way as Hage. He noted that rules and procedures can vary from highly stringent to extremely lax; freedom of discretion is enhanced or limited by the extent to which behavior is preprogramed. Pugh, et al., referred to rules and procedures as both formalization and standardization. They stated, "In highly formalized, standardized, and specialized situations, the occupant of the role has his behavior highly specified, leaving him few options that he can exercise in carrying out his job."[18]

The fourth organizational structure, or means as Hage called it, is stratification. All organizations distribute rewards such as salary or prestige. These rewards result in status differences. In some organizations these rewards are very obvious: the name on the door and the carpet on the floor, or a higher salary. In other organizations, the rewards are more subtle; some individuals are treated as confidants or are given more latitude in observing rules and procedures. Thus, whether formally or informally, some individuals attain greater status than others. The more easily reward symbols are attained, the more open is the system. Conversely, the more difficulty there is in earning the symbols, the more closed or stratified is the organization. Hage and Aiken[19] pointed out that stratification is inevitable in any organization. The difference between organizations is that in some there are minimal differences and in others there are substantial differences. Thus, "The greater the disparity in rewards between the top and bottom status levels and the lower the rates of mobility between them, the more stratified the organization."[20]

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[16] Hage, op. cit., p. 295.

[17] Hall, op. cit., pp. 174-177.

[18] D. S. Pugh, et al., "Dimensions of Organizational Structure," ADMINISTRATIVE SCIENCE QUARTERLY, 13 (June, 1968), 1, p. 75.

In addition to these four "means," Hage outlined four organizational "ends:" adaptiveness, production, efficiency, and job satisfaction. In this study, the concern was with adaptiveness and job satisfaction. As Hage conceived of these ends, it is clear that he referred to what the organization actually does, not its publicly stated goals.

It is reasonable to assert that organizations must maintain a certain level of satisfaction among their members. Job satisfaction, or morale, was included in this essentially structuralist view of organizations as a variable representing the human element within organizations. As Hage and Aiken pointed out, "Organizations . . . must . . . maintain at least a minimal level of morale and loyalty among employees if they are to survive."[21] Organizations do vary considerably in their attitudes toward employees' working conditions and well-being. Some have humane policies and others are exploitative. Job satisfaction is a summary measure of many aspects associated with the job, including salary, pace of work, freedom of movement, hours, discretion, rules, and so on. It is measured by attitude measures and the amount of turnover.

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[19] Hage and Aiken, op. cit., p. 24.

[20] Hage, op. cit., p. 295.

In the Hage formulation, adaptiveness is essentially equivalent to notions associated with the terms change and innovation. "The environment changes: competition increases, technology alters, and new needs are recognized. Adaptations to changes in the environment by organizations are reflected in the adoption of new programs or techniques . . . "[22] It is difficult to conceive of an organization that doesn't change. All organizations change over time as a result of turnover in executive personnel who bring in new ideas and often their own staffs, varying environmental conditions, or gradual assimilation of new knowledge. In this sense, every organization is more or less dynamic, more or less adaptive. Even the most mechanistic, to use a term from Burns and Stalker, of organizations change sooner or later simply as a function of time. While it is apparent that all organizations change, it is also apparent that some organizations change more rapidly than others. Thus, the concern is not with whether organizations change; but what factors are most conducive to change.

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[21] Hage and Aiken, op. cit., p. 27.

[22] Hage, op. cit., p. 292.

The concepts which set the framework for this study have been defined: organizational structure and adaptiveness. For the most part, Hage's formulations have been used in the discussion. These have served to set boundaries to the study.

The Relationship of Structure to Adaptiveness

While any number of variables would be of interest in a study of organizations, six have been selected for this study: complexity, centralization, formalization, stratification, job satisfaction, and adaptiveness. Although this study was designed to show how the first five variables were associated or related to adaptiveness, this was purely an arbitrary decision. In other words, it was a matter of convenience to treat the first five variables as independent variables and adaptiveness as the dependent variable. Such a decision helps regulate discussion and study.

The most interesting aspect of organizational study is that organizations are dynamic systems whose component parts are interactive. Yet this aspect is probably the most difficult to study. The dynamics of organizations is not one-way. While this study assumed that structures in some way affect, or at least are associated with, adaptiveness, it is equally possible that as organizations become more adaptive, their structures change. Therefore, one should not infer one directional causality, but rather a high degree of interdependence among variables.[23] Unfortunately, however, time and other constraints required that this study treat the variables as though they were related in only one way, or direction.

Adaptiveness. The term "adaptiveness" has already been equated with "change" and "innovation." Thus, the problems associated with arriving at a definition of change and innovation are inherent in deriving a definition of adaptiveness. Victor A. Thompson noted the following:

> . . . the weakest part of all innovation related research, is the definition and subsequent measurement of our output variable, innovation. For the time being we should be pragmatic and use what seems best of the kinds of data that are available in the immediate inquiry -- inventions, patents, publications, volume of in- and out-communication, evaluation by outside experts, internal agreement on level of innovation, evaluation by inside knowledgables, relative speed of adoption, etc.[24]

In short, "An operational definition of innovation has not yet been agreed upon and measurement of this output variable is in a chaotic state."[25]

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[23] J. Victor Baldridge, ORGANIZATIONAL CHANGE PROCESSES: A BIBLIOGRAPHY WITH COMMENTARY (Stanford, California: Stanford Center for Research and Development in Teaching, 1970), Research and Development Memorandum No. 57, p. 4.

[24] Victor A. Thompson, BUREAUCRACY AND INNOVATION (University of Alabama: University of Alabama Press, 1969), p. 70.

[25] Victor A. Thompson, op. cit., p. 65.

Several conceptual problems have led to this "chaotic state." Parsons[26] delineated one of these: the distinction between change of the organization and change within the organization. Thompson[27] alluded to the same problem in his discussion of the effects of the task environment on the structure of the organization. As the environment becomes heterogeneous and dynamic, Thompson argued that the organization will become decentralized in order to be more adaptive. In their discussion of the dialectical processes of change, Blau and Scott[28] pointed out how structures change as the result of the introduction of a new technology. Thus, in response to a variety of inputs, the structure of an organization may change. On the other hand, it is conceivable that some kinds of change do not affect structure. Hage and Aiken[29] described welfare agencies that added new programs in an attempt to improve the quality of services to their clients and yet their basic structures were not changed.

Another problem in studying change is determining what represents an important or unimportant change. In other words, how much of what kind of change is important and worthy of consideration? Replacing a conventional textbook series with programed instruction materials is clearly not as significant a change as implementing a computer assisted instructional program (CAI). The significance arises not just from the fact that adopting CAI is more expensive, but also from the impact that CAI has on the work flow process. Unless an innovation in some way contributes to attainment of objectives (or perhaps results in relatively serious dysfunction), the change or innovation is probably not worthy of attention.

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[26] Talcott Parsons, THE SOCIAL SYSTEM (Glencoe, Illinois: The Free Press, 1951), Chapter XII.

[27] J. D. Thompson, op. cit., p. 76.

[28] Peter M. Blau and W. Richard Scott, FORMAL ORGANIZATIONS (San Francisco: Chandler Publishing Company, 1962), pp. 250-253.

[29] Jerald Hage and Michael Aiken, "Program Change and Organizational Properties: A Comparative Analysis," THE AMERICAN JOURNAL OF SOCIOLOGY, 8 (March, 1967), pp. 518-519.

Another problem in studying innovation is deciding when adopting some procedure or equipment is an innovative act. Although kindergarten has been part of American education for some time, many schools do not yet have kindergarten programs. If a school should decide to implement a kindergarten program, is that school being innovative? The answer depends on one's definition of innovative behavior. From a time perspective, such as Rogers',[30] such a school is a laggard since kindergartens have been in existence for some time. In other words, an innovator is one who adopts an idea or product when it is new on the market. On the other hand, if one were to assume the stance taken by Thompson,[31] the school is innovative because it has accepted and implemented an idea new to the school.

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[30] Everett Rogers, "What are Innovators Like?" in Richard O. Carlson, ed., CHANGE PROCESSES IN THE PUBLIC SCHOOLS (Eugene, Oregon: Center for the Advanced Study of Educational Administration, 1965), pp. 56-58.

[31] Victor A. Thompson, op. cit., p. 5.

Another major issue in the study of change and innovation revolves around whether change is essentially a deliberate or an unplanned activity. Baldridge summarized the issue and traced its historical roots to Marx and Weber. He pointed out that the Marxist school of social change argued that change is provoked by constraining factors that force some type of adaptation. Weberians, on the other hand, stressed the role of future orientations, ideological components, and value positions. The former school of thought conceived a change as essentially unplanned, the result of technological, economic, structural, and materialistic factors. The latter emphasized the importance of planning and the critical role that images of the future play in promoting social change. Baldridge concluded his discussion by noting that while the two approaches appear to be opposed, " . . . it becomes more and more obvious that they are actually complementary . . . "[32]

As indicated earlier in the study of organizations, so may the study of innovations be conducted from a psychological, social-psychological, or sociological perspective. Carlson,[33] for example, studied change from a psychological perspective. He focused on the characteristics of the individuals in top decision-making positions, such as school district superintendents. The social-psychological perspective is represented by Miles,[34] who argued that there are certain group characteristics associated with change and innovation. Innovation related research from a sociological or structural perspective is represented by the works of Hage and Aiken in a study of welfare agencies.[35] They found that certain structural characteristics were associated with adaptiveness. For example, the higher the complexity of a welfare agency, the higher the rate of program change. Another problem in the study of change then is the perspective from which one wishes to view an organization.

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[32] J. Victor Baldridge, IMAGES OF THE FUTURE AND ORGANIZATIONAL CHANGE: THE CASE OF NEW YORK UNIVERSITY (Stanford, California: Stanford Center for Research and Development in Teaching, 1970), Research and Development Memorandum No. 58, pp. 2-4.

[33] Richard O. Carlson, ADOPTION OF EDUCATIONAL INNOVATIONS (Eugene, Oregon: Center for the Advanced Study of Educational Administration, 1965), p. 10.

Processes and strategies of innovation are other issues that have concerned many researchers. Rogers[36] outlined five stages from awareness to adoption. Katz[37] argued that communication patterns are important factors in innovation in his two-step communication flow model. Adoption is enhanced when opinion leaders give their support to a new idea or product. Miles[38] also called attention to the importance of processes of change. He was interested in the causes of rapid or slow spread of an innovation and in developing strategies. Another approach to processes and strategies of change is presented by Havelock.[39] The model he developed is essentially a communications linkage model for improving the dissemination and utilization of knowledge. Others, Schmuck and Runkel,[40] for example, attempted to demonstrate the positive effects of change from human relations and group dynamics training.

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[34] Matthew B. Miles, "Educational Innovation: The Nature of the Problem," in M. B. Miles, ed., INNOVATIONS IN EDUCATION (New York: Bureau of Publications, Teacher's College, Columbia University, 1964), p. 655.

[35] Hage and Aiken, SOCIAL CHANGE, op. cit.

[36] Everett Rogers, DIFFUSION OF INNOVATIONS (Glencoe, Illinois: The Free Press, 1962), pp. 40-41.

[37] Elihu Katz, "The Social Itinerary of Technical Change: Two Studies on the Diffusion of Innovation," in Warren G. Bennis, et al., THE PLANNING OF CHANGE (New York, New York: Holt, Rinehart and Winston, Inc., 1969), pp. 230-255.

[38] Miles, op. cit., p. 2.

This review of work associated with innovation and change demonstrates the complexity of the problem and the reasons why there has been little agreement in defining innovation and change. Essentially, because there are different perspectives from which the subject can be studied, there are different ways in which the construct of innovation or innovative behavior can be operationalized for study. Moreover, there undoubtedly are a number of dimensions of innovation. Communications do play an important role. Some processes and strategies do have to be employed to get information about the innovation from the inventor or developer to the potential user. There is probably very little question but that the characteristics of individuals have an effect on how the information is sent and how it is received. Very likely the dynamics of group relationships have some impact on the generation and acceptance of innovative proposals. An organization can be structured so as to be permeable or closed, to be flexible enough to change its structure, and to be tolerant of new ideas generated within the organization.

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[39] Ronald Havelock, PLANNING FOR INNOVATION THROUGH DISSEMINATION AND UTILIZATION OF KNOWLEDGE (Ann Arbor, Michigan: Institute for Social Research, 1969), Chapter 11, p. 16.

[40] Richard A. Schmuck and Philip J. Runkel, ORGANIZATIONAL TRAINING FOR A SCHOOL FACULTY (Eugene, Oregon: Center for the Advanced Study of Educational Administration, 1970), p. 3.

Viewed across the range of concerns and problems in the study of innovation, the subject is too large for any one study. Therefore, some aspect must be chosen to give some boundary parameters. As indicated earlier in the discussion of organizational structure, this study focused on adaptiveness or innovation from a structural perspective. More specifically, the concern was with change within a system rather than of a system. The study was also concerned with changes that contribute to attainment of organizational objectives. It was not concerned with whether the innovation was "new on the market," nor with whether it was imported into the organization or generated within the organization. The study was not concerned with the processes and strategies for diffusion and utilization of innovations. In short, the study focused on those organizational structures, as defined earlier, which may be in some way associated with change within a system so as to improve attainment of organizational objectives regardless of where or how the innovation came from. Innovation was defined as the " . . . acceptance and implementation of new ideas, processes, and products and services . . . "[41] which are " . . . thought to be more efficacious in accomplishing the goals of a system."[42] As indicated earlier, innovation was equated with adaptiveness. Not everyone agrees with this equation, however. Thompson stated:

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[41] Victor A. Thompson, op. cit., p. 5.

> Innovation therefore implies the capacity to change or adapt. An adaptive organization may not be innovative (because it does not generate many new ideas), but an innovative organization will be adaptive (because it is able to implement many new ideas).[43]

Nonetheless, the preponderance of thought favors equating the two terms. Mort made a similar assumption in his classical studies nearly fifty years ago.[44] Hage[45] and Hage and Aiken[46] similarly equated adaptiveness and innovation.

Complexity and Adaptiveness. Complexity already has been defined as the number of occupations or specialties and the length of time for preparation in the occupation or specialty. Hage and Aiken pointed out that these two dimensions of complexity reflect both the extensity and intensity of knowledge in the organization. The longer the period of training for the occupation or specialty, whether formal or informal, and the greater the number of occupations, the more complex the organization.[47] Conceptually, complexity is associated with adaptiveness because both the higher level of training of the specialists and the differing perspectives brought by the various specialists bring more knowledge to the organization's tasks. Highly trained specialists (professionals) expect a certain amount of autonomy in the performance of their roles. Given the autonomy and the level of knowledge and the differing perspectives, one can expect that more proposals for new programs and techniques will be generated. Thus, the greater the complexity, the higher the adaptiveness of the organization.

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[42] Miles, op. cit., p. 14.

[43] Victor A. Thompson, "Bureaucracy and Innovation," ADMINISTRATIVE SCIENCE QUARTERLY, 10 (June, 1965), p. 2.

[44] Paul R. Mort and Francis G. Cornell, ADAPTIBILITY OF PUBLIC SCHOOL SYSTEMS (New York: Bureau of Publications, Teacher's College, Columbia University, 1938).

[45] Hage, op. cit.

[46] Hage and Aiken, "Program Change," op. cit.

There is other theoretical and empirical support for this notion. Wilson stated, " . . . the probability of innovation activity is principally a function of the diversity of the organization."[48] He reports research relating subscription to professional journals and attendance at professional meetings to innovativeness. Thompson also noted that "with the rapid increase of knowledge of all kinds, maintaining a degree of professional depth and currency sufficient to promote innovation requires continuing education of . . . personnel. An organizational unit composed of many professional . . . roles will be much more innovative than an aggregation of individuals all performing the same work."[49] Empirically, the relationship of professional training to innovative behavior has been shown by Carlson,[50] Rogers,[51] and Mort.[52]

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[47] Hage and Aiken, SOCIAL CHANGE, p. 33.

[48] James Q. Wilson, "Innovation in Organization: Notes Toward a Theory," in James D. Thompson, ed., APPROACHES TO ORGANIZATIONAL DESIGN (Pittsburgh, Pennsylvania: University of Pittsburgh Press, 1966), p. 199.

Centralization and Adaptiveness. Centralization has been defined as the distribution of power to make decisions controlling organizational resources. The smaller the proportion of positions that participate in decision making and the fewer the decision areas in which they are involved, the more centralized the organization. "An organization with low centralization has a decision-making arrangement that allows for the representation of different occupational perspectives, thus permitting the interplay between different interests and ideas."[53] Thus, the lower the centralization, the higher the adaptiveness.

Price[54] reported that "A high degree of centralization . . . seems to result in reduced adaptiveness." Lawrence and Lorsch[55] provide additional information supporting this formulation. In their comparative study involving firms in three different industries, they found that the firms characterized by decentralization were more adaptive. Hage and Aiken[56] in their study of welfare agencies found a similar relationship.

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[49] Victor A. Thompson, BUREAUCRACY AND INNOVATION, p. 74.

[50] R. O. Carlson, op. cit.

[51] Rogers, DIFFUSION AND INNOVATIONS.

[52] Mort, op. cit.

[53] Hage and Aiken, op. cit., p. 39.

[54] Price, op. cit., p. 93.

[55] Paul R. Lawrence and Jay W. Lorsch, ORGANIZATION AND ENVIRONMENT (Homewood, Illinois: Richard D. Irwin, Inc., 1969), pp. 155-156.

Stratification and Adaptiveness. Stratification refers to the distribution of rewards to the positions or jobs in an organization. Rewards and status may be earned formally or informally. That is, promotion and salary increases may be based on clearly defined procedures and criteria, or a person's prestige may be enhanced by such subtle means as being allowed more discretion in observing rules. Stratification affects adaptiveness primarily because change often means a reallocation of rewards. If the reallocation favors those who already have the prestige and status, the proposal for change is more likely to be accepted. In highly stratified organizations, persons in subordinate roles are not likely to suggest innovative ideas since the proposals are an implicit criticism of present arrangements and thus of the persons who instituted them. Stratification also affects communication channels--one must observe protocol--and the means by which innovations are proposed to higher levels often serve to veto an idea. If rewards are scarce, then competition for those rewards will tend to reduce communication of new proposals.

Thompson[57] in discussing the effects of rewards noted that the extrinsic rewards distributed by the hierarchy of authority greatly reinforce the institution. This suggests that rewards distributed by the organization tend to reinforce the status quo since most institutions do not look favorably on proposals for change which have the potential for being disruptive to programs and procedures in effect. Blau and Scott[58] reported experimental small group research which tends to support the idea that status differences inhibit communication--particularly communication of the sort that might be interpreted as threatening. Thus, the lower the stratification, the higher the adaptiveness.

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[56] Hage and Aiken, "Program Change," p. 511.

[57] Victor A. Thompson, op. cit., p. 21.

Formalization and Adaptiveness. Formalization refers to the degree to which decision rules for any job are codified and the degree to which persons in positions have discretionary latitude. That is, if an organization has rules which attempt to cover all possible situations and contingencies and persons do not have any discretionary powers in applying these rules, the organization is highly formalized. When role and job behaviors are highly prescribed or proscribed, little room is left for an individual or groups to propose or initiate changes. Thompson has noted, "If a person's activities are completely programmed there is no room for innovation."[59] Thus, the lower the formalization, the higher the adaptiveness. Hage and Aiken suggested, " . . . the paucity of rules . . . may spur organizational change because of the search for some guidelines of behavior by those who dislike their ill-defined situation."[60]

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[58] Blau and Scott, op. cit., Chapter 5.

[59] Victor A. Thompson, op. cit., p. 75.

[60] Hage and Aiken, SOCIAL CHANGE, p. 44.

While there is considerable theoretical or conceptual support for the suggested relationship between formalization and adaptiveness, there is surprisingly little empirical support. This is somewhat surprising in light of the commonplace assumption that bureaucracies, the bastion of rules, are resistant to change. Hage and Aiken, reporting on research conducted in welfare agencies, found a negative correlation between rule observation and adaptiveness.

Job Satisfaction and Adaptiveness. Morale and job satisfaction are generally equated and refer to the humane or humanizing aspects of an organization. While there are many dimensions to job satisfaction, such as salary, working conditions, the work itself, and recognition, it is reflected in the commitment of individuals to the organization and its goals. Satisfied employees are generally motivated and involved in their work.[62] A consequence of satisfaction is that people are more receptive to new ideas. These same people are also likely to be willing to try innovations suggested by others.[63] Thus, the higher the job satisfaction, the higher the adaptiveness.

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[61] Hage and Aiken, op. cit., pp. 44-45.

[62] Edward E. Lawler, III and Lyman W. Porter, "The Effect of Performance on Job Satisfaction," in L. L. Cummings and W. E. Scott, eds., ORGANIZATIONAL BEHAVIOR AND HUMAN PERFORMANCE (Homewood, Illinois: Richard D. Irwin, Inc., and The Doresey Press, 1969). pp. 283-290.

[63] Hage and Aiken, op. cit., p. 53.

Both Eidell, et al.,[64] and Hage and Aiken[65] found that job satisfaction is comprised of two components. One deals with satisfaction with the job itself and the other with social relations with other employees. These have been called instrumental satisfaction and expressive satisfaction. Hage and Aiken[66] reported that instrumental satisfaction was positively correlated with adaptiveness while expressive satisfaction was negatively correlated in a study of welfare agencies. It appears that satisfaction with the job itself is associated with willingness to suggest and implement new ideas. However, innovation can have a negative and disruptive effect on social relations.

In addition to the Hage and Aiken research, other empirical evidence relating satisfaction to change has been contributed. Blau, in his study of two state agencies, found that certain conditions generate favorable attitudes toward change. Among these were identification with policies, achievement of objectives, job security, and social security.[67] The first two suggest commitment to the organization and a sense of accomplishment; the latter two speak for themselves.

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[64] Terry L. Eidell, Ronald Little, and Jon Thorlacius, "Uniformity and Variability in the Organizational Characteristics of Elementary Schools," a paper presented at the 1969 annual meeting of the American Educational Research Assoc., in Los Angeles, California (Center for the Advanced Study of Educational Administration, Eugene, Oregon), p. 2.

[65] Hage and Aiken, op. cit., pp. 54-55.

[66] Hage and Aiken, op. cit.

[67] Peter M. Blau, THE DYNAMICS OF BUREAUCRACY: A STUDY OF INTERPERSONAL RELATIONS IN TWO GOVERNMENT AGENCIES (Chicago, Illinois: University of Chicago Press, 1955), pp. 198-200.

Summary. While the various structural elements of an organization have been presented singly and related to adaptiveness, it is obvious that these elements are interrelated. In some manner, each element contributes positively or negatively to the degree of an organization's adaptiveness. An organization with a variety of occupations and specialties each requiring extensive and intensive training (i.e., professionals) will probably also experience pressure to decentralize decision making with regard to control of organizational resources. Professionals will also want more discretion. Thus, there will be strong resistance to highly prescribed and/or proscribed job descriptions. Participation in decision making and variable working conditions with regard to discretionary latitude in performing the work will contribute to higher job satisfaction. Conceptually, the combination of these factors interacting should result in a relatively more adaptive organization.

Application to Elementary School Organization: Operational Definitions

The development of organizational theory has, to a large extent, almost solely, been done on the basis of both practical and scientific work in non-educational settings. In the early history of concern with creating more efficient and effective organizations, the major writers were practicing managers or chief executive officers of large corporations. Weber and Parsons were primarily social scientists; the first concerned with law and economics initially, the latter with sociology in its broadest sense. Nonetheless, these men have had a substantial impact on organizational theory. Empirical work on organizations also initially focused on private corporations. Recently, there has been research in medical settings and governmental agencies.

Out of both the conceptual and empirical work have come some generally accepted formulations and concepts about organizations. While these may in some general sense be applied to all organizations, these general propositions, axioms, and concepts must be particularized to the kind of organization under study. While concepts such as stratification or complexity may be applicable to all organizations, operational definitions of these concepts undoubtedly will differ for different organizational settings. Thus, some attention must be devoted to operationalizing the concepts of structure and adaptiveness to the focus of this study, elementary schools. Since the conceptual framework of this study was derived primarily from Hage's axiomatic theory of organizations, the operationalizing of the concepts used in this study adhered as closely as possible to those used by Hage.[68]

Complexity. Axiomatic theory defined two indicators of complexity--the number of occupational specialties and the level of training required for each specialty. In an educational setting this structural concept does not present serious problems, except that it is not likely for an elementary school building to have very many specialists other than teachers in the building on a full-time bases. Unless the elementary attendance center is unusually large, one is not likely to find fulltime counselors, psychologists, social workers, and so on. Thus, one would expect that the full-time personnel in a school building would be comprised primarily of teachers, a principal, and perhaps some paraprofessionals. However, for these other specialists to have much impact on the programs of a school, they will have to spend enough time in the building to carry out their specific tasks and to participate in decision making and planning with the fulltime staff. In the absence of any evidence about how much time is needed for such participation, an arbitrary limit of at least ten hours per week, or one-fourth time, seemed sufficient.

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[68] Hage, "Axiomatic Theory," Hage and Aiken, "Program Change," and Hage and Aiken, SOCIAL CHANGE.

With regard to length of training, with the exception of some paraprofessionals, most of the specialists in an elementary school are professionals. That is, they have gone through a lengthy pre-entry training period of four or five years duration. Since this is generally the case, and since any effort to keep abreast of new developments in education are gleaned from professional activities such as participation in professional meetings and subscription to professional journals, differences in length of training are likely to be as a result of such professional activities.

Centralization. The proportion of jobs that participate in decision making and the number of areas in which decisions are made are the two indicators of centralization. As noted previously, most elementary attendance centers are comprised primarily of two different jobs or positions, principal and teachers. Paraprofessionals are increasingly becoming established in full-time positions in elementary schools. Since there are basically only two jobs that can participate in decision making in an elementary school, this indicator is somewhat irrelevant. If decision making is to be decentralized, then there is only one additional position that can be included, the teacher. A more important indicator of centralization for elementary schools, therefore, is the number of areas in which teachers participate in decision making.

Formalization. The proportion of jobs that are codified and the range of variation allowed within jobs are the indicators of formalization. As indicated before, the range of jobs in an elementary school is limited. If jobs are to be codified, there will be teaching jobs and paraprofessional jobs. In addition, since teaching jobs are generally considered professional positions, it is not likely that such positions will be highly codified. For the most part, highly prescriptive and/or proscriptive rules and procedures are not necessary for teachers since they are expected to have been socialized during their pre-professional training period. While negotiated master contracts may be quite specific in defining the rights and duties of teachers, time and resource limitations for this study precluded obtaining such documents and codifying them for analysis. Thus, the indicator of formalization employed in this study was the extent to which teachers perceived themselves to be restricted in adhering to such rules as may exist in the school.

Stratification. This structural construct is one of the most difficult to operationalize in the setting of an elementary school. Its indicators are the differences in income and prestige among jobs and the rate of mobility between low- and high-ranking jobs or status levels. The hierarchy of an elementary school is relatively flat. There is only one position with only one occupant to which a teacher may aspire in any one building, the principalship. Moreover, within the teacher ranks, there is no salary differential other than that which can be gained by experience or additional professional preparation. Thus, ordinarily one would not expect to find different jobs among which there are differences and ordinarily mobility between a teaching job and a principalship is restricted within a building. As stated in the theory, these indicators are not directly applicable to elementary schools.

Even though one would not expect to find differences and mobility among jobs at different status levels, one could expect to find an informal "pecking" order among teachers. That is, some teachers are likely to be treated more favorably than others by the administrator. Some teachers are likely to be more influential among their peers than others. As a consequence, a status system does develop although not as a result of direct and approved rewards, but as a result of implicit and indirect behavior. By extension, the discussion of stratification by Hage and Aiken[69] implied such an informal, implicit system of stratification. Thus, for the purposes of this study, the indicator of stratification in elementary schools was the extent to which teachers felt that other teachers have greater status, prestige, or are given preferential treatment.

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[69] Hage and Aiken, SOCIAL CHANGE.

Job satisfaction. As with the other structural concepts, there are two indicators of job satisfaction. One is satisfaction with working conditions; the other is the rate of turnover in job occupants per year. The first indicator, satisfaction with working conditions, is relatively straightforward and applicable to educational settings. The latter indicator, however, is confounded somewhat by economic conditions which are reflected in the job market and the location of the school. While at one time there was an undersupply of teachers, presently there generally is thought to be an oversupply. In situations of teacher undersupply, the rate of turnover may, in part, be due more to opportunities to receive higher salary rather than to serious dissatisfaction with the present situation. Also, since a majority of elementary teachers are married women, turnover may result from family circumstances, such as a job change for the husband. Finally, turnover in cities that have a large university may not be a function of dissatisfaction but of graduation from the university. In time of teacher oversupply, turnover is suppressed because there is not a wide availability of jobs. For these reasons, the rate of turnover was not used as an indicator of job satisfaction in this study. Only one indicator was used, satisfaction with the job itself and with interpersonal relationships on the job.

Many aspects of a job are related to working conditions and thus relate to job satisfaction. Some of these aspects are related to the other structural variables described above. For example, Blau and Scott[70] pointed out that high satisfaction results when professionals have freedom to make decisions and exercise discretion, when there is not close supervision, and when there is freedom from rigid operating rules. Thus, centralization and formalization are related to job satisfaction. Eberle[71] made a similar point in his discussion of satisfaction. In a discussion of job satisfaction, Houser and Wigdor[72] suggested that such factors as recognition, the work itself, competence of the administrator, and interpersonal relations affect job satisfaction. Anderson[73] noted that a teacher's standing with his colleagues and accomplishment of personal goals also contribute to satisfaction. Another important dimension of job satisfaction has to do with relations with colleagues and superordinates in the organization. Price[74] indicated that human relations competence among supervisors had more to do with job satisfaction than technical or administrative competence. Similarly, Tope[75] argued that human working relationships within the organization are more important than salary in job satisfaction. Thus, job satisfaction can be conceptualized into two major dimensions. One has to do with the specific conditions surrounding the work or tasks and the other has to do with relations with other persons in the organization. Eidell[76] called the former instrumental satisfaction and the latter expressive satisfaction. In this study, job satisfaction was defined in terms of specific working conditions and in terms of expressive relationships.

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[70] Blau and Scott, op. cit., pp. 130, 150, & 179.

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[71] Robert Eberle, "Personnel Management for Change and Innovation in Education," CONTEMPORARY EDUCATION, 39 (May, 1968), 6, p. 261.

[72] Robert J. Houser, and Lawrence A. Wigdor, "Huzburg's Dual-Factor Theory of Job Satisfaction and Motivation: A Review of the Evidence and a Criticism," in L. L. Cummings and W. E. Scott, op. cit., pp. 290-302.

[73] James G. Anderson, BUREAUCRACY IN EDUCATION (Baltimore: The John Hopkins Press, 1968), p. 15.

[74] Price, op. cit., p. 151.

[75] Donald E. Tope, "Summary of Seminar on Change Processes in the Public Schools," in Richard O. Carlson, op. cit.

Adaptiveness. As indicated earlier, the dependent variable in this study was adaptiveness or innovativeness of the organization. Hage's two indicators of adaptiveness are the number of new programs adopted in a year and the number of new techniques adopted in a year. Operationalizing these two indicators in terms of the elementary school presented some problems. In one sense, the total curriculum of a school is an instructional program. At the same time, educators talk about reading programs, music programs, math programs, and so on. Thus, the definition of an educational program is not clear. Moreover, if there are changes in curriculum it is more likely to be the replacement of old activities than the addition of new efforts. For instance, schools don't ordinarily add reading to the curriculum. Instead, a reading program is replaced by a new one which presumably will be more effective than the old one.

As with the term, "program," the term, "techniques," also presented problems. It is virtually impossible to select from all of the possible techniques which teachers and principals may employ those which are in some sense more important than others or those which are more effective than others. Few, if any, of the techniques which teachers use or have available for their use have been empirically validated or proven reliable from teacher to teacher. Many of the techniques are teacher developed and thus are unique to a classroom or building.

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[76] Eidell, et al., op. cit., p. 2.

To resolve the issue, reference was made to Hage's original rationale in being concerned with the adaptiveness of organizations. It is clear that he viewed adaptiveness in relation to the organization's environment.[77] With regard to service oriented organizations, such as schools, a major component of the environment is the organization's clientele. The clientele of elementary schools is the children which the schools serve. Therefore, a school is adaptive to the extent that it responds to the needs of its clients.

It is now rather common knowledge that there exists a wide variety of differences among children. Because of this recognition, a substantial amount of effort has been devoted to the development of programs to individualize instruction. These efforts have gone on at both the local and national level. Many schools have attempted to develop individualized programs and substantial federal funds have been invested in large research and development programs. The aim of these efforts has been to generate the means by which schools can adapt their programs to meet the needs of the individual child rather than treating large groups of children as if they all were alike. Several years ago Mort commented, "Adaptibility, or the capacity to meet . . . needs . . . , is indispensible to the effective functioning of any school system."[78] More recently, Carlson noted that the adoption of programs to provide an adequate education for school clients was at the heart of the innovation issue.[79] Operationally, for the purposes of this study, schools were adaptive to the extent that they carried out activities in response to the differing characteristics of the children they serve. In other words, schools were adaptive when they individualized their instructional programs.

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[77] Hage, op. cit., p. 292.

Statement of the Problem

The purpose of this study was to investigate the relationship between organizational structure and adaptiveness of organizations. Specifically, it was designed to identify differences in the adaptiveness of elementary school organizations related to variances in five structural variables: complexity, centralization, formalization, stratification, and job satisfaction. Thus, the main hypothesis of the study was that there is no relationship between the properties of organizational structure and organizational adaptiveness. The question which followed from the main hypothesis was concerned with the extent to which any of the structural variables related to adaptiveness. Therefore, it was also hypothesized that there existed no relationship between:

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[78] Mort, op. cit.

[79] Carlson, ADOPTION OF EDUCATIONAL INNOVATIONS, p. 2.

Complexity and adaptiveness,
Centralization and adaptiveness,
Formalization and adaptiveness,
Stratification and adaptiveness,
Instrumental job satisfaction and adaptiveness, and
Expressive job satisfaction and adaptiveness.

Limitations of the Study

First, while this study focused on one organizational entity, the elementary school, one must recognize that elementary schools are, for the most part, only one unit in a larger complex organization, the school system. Since no attempt was made to ascertain the impact of the larger system on the unit of study, the results must be interpreted with some qualification. Second, data were gathered only about or from teachers who were full-time employees in the building and not from the principal. Thus, the perceptions will reflect only the views of the teachers and not of other persons who may influence the activities in the building. Finally, the perspective of the study is sociological, looking at the relationship of structures to adaptiveness. Clearly, psychological and socio-psychological variables also may have an impact on an organization's adaptiveness.

CHAPTER II

DESIGN AND METHODOLOGY

The purpose of this chapter is to describe the study's methodology and the statistical treatment of the data. The chapter is composed of four sections which consider, respectively, a description of the questionnaire, a definition of the study's population and sample, a description of the procedures for data collection, and the statistical techniques employed in analyzing the data.

The Questionnaire

A survey instrument covering the seven organizational variables described in Chapter I was developed and pilot tested for this study. Called the Elementary School Structure Survey (ESSS), the instrument (see Appendices A and B) contained subscales for the following variables: complexity, centralization, formalization, stratification, instrumental job satisfaction, expressive job satisfaction, and adaptiveness. The first six subscales measured the independent variables and the seventh subscale measured the dependent variable. A form for principals and a form for teachers were developed.

Development of Subscales

In part the ESSS was adapted from other instruments and in part developed from a review of the literature. The complexity subscale used in the principal's form was adopted from Herrick,[1] and was designed to secure information about the number of occupations or specialties on an elementary school staff. The principal's form of the ESSS was comprised only of this subscale. The second indicator of complexity, length of training, was measured in the complexity subscale of the teacher's form. Thus, the measures for complexity covered both of Hage's indicators,[2] the number of occupations or specialties and length of training for members in the organization.

A measure of centralization was developed by Herrick[3] and was adopted for this study. As discussed in Chapter I, the limited number of social positions in an elementary school precludes obtaining a measure on the proportion of jobs that participate in decision making. Thus, the questionnaire elicited information related only to the number of areas in which teachers may participate in decision making. The subscale was not concerned with the processes or steps in decision making such as analyzing the problem, deriving alternatives, and so on, nor with the constraints to decision making. It was concerned only with the extent to which the right or authority to make decisions related to control of organizational resources and job related activities had been delegated to teachers. Therefore, the items dealt with such matters as budget preparation, selection of staff, program recommendations, staff evaluation, and similar matters. Hage and Aiken found that decisions related to control of organizational resources were associated more highly with adaptiveness than with the right to make less important decisions.[4]

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[1] H. Scott Herrick, RELATIONSHIP OF ORGANIZATIONAL STRUCTURE TO TEACHER MOTIVATION IN TRADITIONAL AND MULTIUNIT ELEMENTARY SCHOOLS, dissertation proposal (Madison, Wisconsin: University of Wisconsin, Department of Educational Administration, 1972).

[2] Jerald Hage, "An Axiomatic Theory of Organization," ADMINISTRATIVE SCIENCE QUARTERLY, 10 (December, 1965), p. 293.

[3] Herrick, op. cit.

In Hage's formulation, formalization is measured by the proportion of jobs that are codified and the range of variations allowed within jobs. As with the measures for centralization, the limited number of social positions in the elementary school obviates the first measure. Thus, the scale used in this study focused on the second indicator. The formalization subscale was comprised of two sections. One section asked teachers to indicate whether or not there were rules and procedures for certain activities, and the second section elicited the degree to which teachers perceived these rules to be enforced. On the basis of information gathered during the pilot test of the ESSS, the first section was retained but was not used in the analysis. Retention of the first section was designed to help respondents focus on the matter of rules in order to respond better to the second section of the subscale.

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[4] Jerald Hage and Michael Aiken, "Program Change and Organizational Properties: A Comparative Analyis," THE AMERICAN JOURNAL OF SOCIOLOGY, 8 (March, 1967), p. 512.

The subscale for stratification was adapted from Herrick.[5] As with formalization and centralization, the indicators for stratification suggested by Hage[6] are not altogether applicable in elementary school organizations. In schools there are very few formal rewards which are distributed differentially. Ordinarily, staff members do not have private offices nor is salary based on merit. Thus, status and rewards are more often provided in terms of special favors such as appointment to committees or first choices of new equipment. The items selected for this subscale reflect these kinds of status or reward symbols.

The two job satisfaction subscales were adapted from instruments developed by Herrick,[7] Pellegrin,[8] and Hage and Aiken.[9] The subscales are not explicitly denoted in the questionnaire but appear under one heading of job satisfaction. The sources mentioned above were corroborated by a review of the literature. Instrumental job satisfaction is generally measured by such concerns as physical facilities, career expectations, availability of materials and equipment, satisfaction with performance of supervisor, and involvement in important decisions. Expressive job satisfaction is measured by questions which ask the respondent to indicate how he gets along socially with peers and supervisors.

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[5] Herrick, op. cit.

[6] Hage, op. cit., p. 293.

[7] Herrick, op. cit.

[8] Rolland Pellegrin, FORM T, Organizational Studies Project (Eugene, Oregon: Center for the Advanced Study of Educational Administration, 1968).

[9] Michael Aiken and Jerald Hage, Questionnaire prepared for a study of health and welfare organizations provided to the investigator by Mr. Aiken (Madison, Wisconsin: University of Wisconsin, Department of Sociology, 1970).

A subscale to measure adaptiveness as defined in Chapter I was developed _de novo_. A comprehensive review of the literature related to individualization was undertaken. The review involved both scholarly journals and professional (practitioner oriented) journals. The works of 32 authors, many with several references, were reviewed.

Two observations about the literature on individualization warrant discussion. First, the scholarly literature appeared to revolve around two major conceptual schemes related to individual differences. One stream of thought and research derives from a model developed by Carroll.[10] His conceptualization is that individual differences among children are a function of time needed to learn. Bloom agreed with Carroll in his approach to mastery learning.[11] The other formulation attempting to explain individual differences is best represented by Cronbach.[12] He argued that aptitude and treatment interact and that individual differences can best be accommodated by varying the instructional treatment in accordance with the learner's aptitude. As one might expect, the empirical evidence for each point of view is somewhat mixed.

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[10] John B. Carroll, "A Model of School Learning," TEACHERS COLLEGE RECORD, 64 (1963), p. 725.

[11] Benjamin S. Bloom, "Learning for Mastery," EVALUATION COMMENT (Los Angeles, California: University of California at Los Angeles, Center for the Study of Evaluation, May, 1968).

[12] Lee J. Cronbach and Richard E. Snow, FINAL REPORT: INDIVIDUAL DIFERENCES IN LEARNING ABILITY AS A FUNCTION OF INSTRUCTIONAL VARIABLES, ED 029001 (Bethesda, Maryland: ERIC Document Reproduction Center, 1969), p. 177.

The second observation is that the review of the professional literature revealed a mixture of both theoretical schemes on the part of those who have tried to operationalize individualized programs. Most individualized programs described in the literature reviewed attempted to accommodate rate of learning as well as provide a variety of instructional materials, methods, and equipment. It was also obvious that the professional literature was the only source that could provide the operational descriptions concerning what an individualized program provides in an attempt to adapt instruction to the varying characteristics of children. At this point in time, it would appear that operational programs of individualization arise out of a practical response (as opposed to a theoretical response) to the problems of providing an adaptive instructional program. The wide range of achievement levels in fifth grade, for example, leads logically to the notion of non-gradedness. Similarly, teachers observe that a child does not learn some skill or concept in a particular kind of situation so a different setting is devised. Cronbach pointed out that operational programs of individualization are "atheoretical."[13] Thus, in search of operational descriptions of individualization, attention was focused on the professional literature as well as the scholarly journals. The items for the adaptiveness subscale were generated on the basis of descriptions of operational programs of individualization.

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[13] Cronbach and Snow, op. cit., p. 91.

Survey Format

Two types of scales[14] are utilized in the ESSS. Because of the nature of the variable of complexity and its operational definition, a nominal scale was utilized. The remainder of the subscales in the ESSS, however, are ordinal. For the variables represented in these subscales, the magnitude or degree to which each variable or property exists in the organization is of interest. Even though the exact degrees of magnitude are not known, a Likert-type five-point scale was adopted. Rather than have respondents determine the magnitude of the property and thus result in a very wide range of judgments which would be extremely difficult to interpret or analyze, the five-point response scale was included in order to be able to rank order consistently the schools with regard to the variables. Since the magnitude of the properties under investigation cannot be measured against some absolute standard and are thus measured in terms of more or less, any method which can rank order the objects under consideration (in this case, schools) is satisfactory.[15]

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[14] Warren S. Torgerson, THEORY AND METHODS OF SCALING (New York, New York: John Wiley and Sons, 1967), pp. 205-214.

[15] Fred N. Kerlinger, FOUNDATIONS OF BEHAVIORAL RESEARCH (New York, New York: Holt, Rinehart and Winston, Inc., 1964), p. 447.

Validity and Reliability

The ESSS was presumed to be content valid since the items were either adapted from other instruments used in similar research or developed on the basis of a review of the literature, or both. Kerlinger has pointed out that content validity is basically judgmental based on the theory from which an investigator has derived hypotheses.[16]

One means of assuring content validity is to have other competent persons make judgments on the terms related to each property. With regard to the subscales related to the six independent variables, this process was essentially carried out since the items were largely borrowed from other survey instruments used in investigations related to these variables. Adaptations had to be made to assure that items were applicable to elementary schools.

Since the subscale for adaptiveness was not adapted from other scales, a validation procedure outlined by Torgerson[17] was utilized. The review of the literature led the investigator to conceptualize thirteen major categories of concerns with individualization. These were: materials, equipment, pace of learning, space utilization, student participation, teaching methods, children as teachers, grouping patterns, cooperative planning and teaching, community involvement, teacher function, student freedom, and assessment procedures. Fifty-six items were generated to cover these categories. A panel of judges, presumed to be expert on the basis of reputation and recommendation, was asked to place each item in one of the categories and then to rate each item with regard to its importance to individualization. Some items were purposely designed to reflect traditional or non-individualized methods to keep respondents from developing a mind-set as they filled out the questionnaire.

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[16] Kerlinger, op. cit., p. 423.

[17] Torgerson, op. cit., pp. 205-214.

The results of the judges' efforts were analyzed in three ways. First, judges were compared on the basis of their placement of items into the categories. Even though one judge was found to be discrepant, but not seriously so, all responses from all judges were used in the balance of the analysis. In the second step, items were compared with placement into the previously identified categories. Items related to student freedom and student participation were found not to discriminate between these categories. A similar case was observed with regard to categories of teaching methods and teacher function. Consequently, these four categories were collapsed into two categories: student freedom/participation and teacher methods/functions. Items were retained if they were placed into a category by six of the seven judges.

In the third analysis, the judges' rating of the importance of the items to individualization was considered. The ratings were performed on a five-point scale with "1" representing least important and "5" most important. Mean ratings were calculated for each item retained from the second analysis. To be retained each item had to have a mean rating of at least 1.0 or -1.0. All items related to the category of community involvement were eliminated, thus eliminating this category from the subscale. Thirty-two items were retained in the final version of the subscale.

Following validation of the adaptiveness subscale, the ESSS was pilot tested. Forty questionnaires were distributed to teachers in two schools which met the criteria (to be discussed later in this chapter) established for selection of the study sample. Thirty-seven questionnaires were returned. The purpose of the pilot test was to obtain reliability coefficients on all subscales.

A reliable instrument is one which consistently measures a set of objects with the same or comparable results. Reliability can also be defined as the relative absence of errors of measurement in a measuring instrument. This latter definition is perhaps the most crucial one since it is more desirable to have items which mean essentially the same thing to all respondents.

Reliability of the subscales in the ESSS was calculated on PROGRAM TSTAT[18] both after the pilot test and after receipt of the questionnaires from the study example. The respective reliability coefficients for each of the subscales are shown in Table 1.

The relatively low reliability coefficient for the formalization subscale is due to the fact that it contained only four items.

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[18] Dennis W. Spuck, PROGRAM TSTAT (Madison, Wisconsin: University of Wisconsin, Wisconsin Information Systems for Education, April, 1971).

TABLE 1

RELIABILITY COEFFICIENTS FOR SUBSCALES IN THE ESSS

Subscales	Reliability for Pilot Test Version	Reliability after Final Administration
Complexity	Not Applicable; Scale is Nominal	
Centralization	.8486	.7950
Formalization	.6809	.6174
Stratification	.8381	.8806
Job Satisfaction:		
Instrumental	.8858	.8092
Expressive	.8635	.8297
Adaptiveness	.8720	.8822

Study Population and Sample

As the statement of the hypotheses for this study suggests, this study attempted to explain the relationship between the structural properties of elementary schools as organizations and their ability to carry out instructional activities which are responsive to the differing characteristics of children in the school, i.e., to carry out individualized instruction. The theory from which these structural properties were taken makes no distinction between kinds of organizations. In other words, the theoretical constructs of the theory are defined in such a way as to apply to all organizations. With regard to elementary schools as organizations, it should, therefore, make no difference whether elementary schools are organized in age-graded, self-contained classrooms with teachers operating independently and responsible for the total instructional program for 30 or so students or whether they are organized to accommodate team teaching, collaborative decision making and planning, or non-graded programs. All elementary schools should have these structural properties to some degree.

Given the above assumption, it was decided to use this opportunity not only to investigate the relationships between properties of organizational structures and organizational adaptiveness in elementary schools, but also to make a comparison between a relatively new organizational design for elementary schools and traditionally organized schools. The Multiunit School-Elementary (MUS-E)[19] developed at the Wisconsin Research and Development Center for Cognitive Learning was chosen for this comparison (see Appendix C).

The MUS-E is the organizational component of the system of Individually Guided Education (IGE) which is the basic research and development program at the Wisconsin R & D Center. IGE is a system which accounts for the rate, style, level of motivation, and other characteristics of children. This alternative approach to education has been demonstrated to be a viable one[20] resulting in improved learning for many children. It has also been widely accepted by school personnel; over 1,000 IGE/MUS-E schools were implemented in several states during the 1971-72 and 1972-73 school years. The MUS-E was designed to make the implementation of the concepts and practices of IGE feasible. As such, it incorporates team teaching, collegial decision making, cooperative planning, differentiated staffing, and accountability at all levels. Past field testing and research of the MUS-E has focused on such matters as children's learning,[21] achievement of performance objectives,[22] children's attitudes,[23] and interpersonal and leader behaviors.[24] No research had yet been conducted to determine whether or not MUS-E's are more adaptive than traditionally organized schools.

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[19] Herbert J. Klausmeier, Mary R. Quilling, Juanita S. Sorenson, Russell S. Way, and George R. Glasrud, INDIVIDUALLY GUIDED EDUCATION AND THE MULTIUNIT ELEMENTARY SCHOOL: GUIDELINES FOR IMPLEMENTATION (Madison, Wisconsin: University of Wisconsin, Wisconsin Research and Development Center for Cognitive Learning, 1971), pp. 17-30.

[20] Herbert J. Klausmeier, Mary R. Quilling, and Juanita S. Sorenson, THE DEVELOPMENT AND EVALUATION OF THE MULTIUNIT SCHOOL, Technical Report #158 (Madison, Wisconsin: University of Wisconsin, Wisconsin Research and Development Center for Cognitive Learning, 1971).

The population of schools for this study consisted of 1,000 MUS-E's located in 14 states, established under the aegis of the Wisconsin Research and Development Center for Cognitive Learning and a corresponding set of non-multiunit schools located in the same districts. Since the multiunit organization is a relatively new arrangement for carrying out instructional programs, the selection of an adequate sample posed some problems which precluded obtaining a random sample. It has been the observation of the investigator and other R & D Center staff members who have been involved in the implementation of the MUS-E that from one to two years is required before a multiunit school staff is able to carry out its operations relatively smoothly. To collect data from newly organized schools would introduce a bias which is primarily a function of inexperience in new roles and operations. Therefore, attempts were made to secure a sample of multiunit schools on the basis of the following criteria:

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[21] Klausmeier, et al., THE DEVELOPMENT AND EVALUATION OF THE MULTI-UNIT SCHOOL, op. cit.

[22] Klausmeier, et al., THE DEVELOPMENT AND EVALUATION OF THE MULTI-UNIT SCHOOL, op. cit.

[23] Richard G. Nelson, AN ANALYSIS OF THE RELATIONSHIP OF THE MULTI-UNIT SCHOOL ORGANIZATIONAL STRUCTURE AND INDIVIDUALLY GUIDED EDUCATION TO THE LEARNING CLIMATE OF PUPILS, Technical Report #213 (Madison, Wisconsin: University of Wisconsin, Wisconsin Research and Development Center for Cognitive Learning, 1972).

[24] Kenneth B. Smith, AN ANALYSIS OF THE RELATIONSHIP BETWEEN EFFECTIVENESS OF THE MULTIUNIT ELEMENTARY SCHOOL'S INSTRUCTIONAL IMPROVEMENT COMMITTEE AND INTERPERSONAL AND LEADER BEHAVIORS, Technical Report #230 (Madison, Wisconsin: University of Wisconsin, Wisconsin Research and Development Center for Cognitive Learning, 1972).

1. The multiunit organization had been implemented at least two years;
2 The principal had been in the building at least three years;
3. A majority of the unit leaders had been unit leaders for two years; and
4. There were more than 10 teachers in the building.

For each of the twenty multiunit schools selected, an attempt was made to secure a matching non-multiunit school from the same district on the basis of similar socio-economic status (SES) levels and size. To determine SES level, principals were given a choice of indicating whether the school was a high, medium, or low SES. The principals in non-multiunit schools were to have been in the building at least three years.

For a variety of reasons, not all of the multiunit and non-multiunit schools finally selected met all of the desired characteristics.

In part, since many of the multiunit schools had been implemented only in the past year or so, there was a limited number of MUS-E schools from which a sample could be taken. Many schools did not wish to cooperate. One of the concerns reflected in the criteria was that both multiunit and non-multiunit schools have some stability. However, for a variety of reasons, districts had recently reassigned personnel within some districts. Of the final sample of multiunit schools, 15 were in operation for at least two years, and 5 were in operation for one year. All principals had been in the school at least two years, and in 11 MUS-E schools, unit leaders had been in that position for two years. Not all of the non-multiunit schools were matched with the multiunit schools in terms of being from the same school district, although most had an equivalent SES level. Most schools were matched in size. Table 2 compares the characteristics of the multiunit and non-multiunit schools in the sample.

Unfortunately, in selecting 40 schools under the constraints that the multiunit schools had to have been reasonably well established and implemented under the aegis of the Wisconsin R & D Center, the sample is not as methodologically pure as one might desire. However, obtaining samples of organizations that are comparable on certain obvious characteristics such as size, stability, and location is one of the most serious problems in organizational research. In addition, one of the purposes of such research is to identify organizational characteristics and validate theoretical constructs that are common to all kinds and sizes of organizations. For this reason, such variables as technology, organizational goals, structures, processes, and task environment have

TABLE 2

CHARACTERISTICS OF SAMPLE SCHOOLS

Schools in Matching Pairs[1]	Number of Years as MUS-E	Tenure of Principal (Years)	Average Unit Leader Tenure	Number of Teachers in Building	SES Level	Pair in Same District
School # 1	2	2	2	22	Low	Yes
School #21	NA	3	NA	23	Low	Yes
School # 2	2	10	2	12	Med	Yes
School #22	NA	5	NA	16	Med	Yes
School # 3	2	4	2	18	Med	Yes
School #23	NA	5	NA	15	Med	Yes
School # 4	2	2	2	22	Med	No
School #24	NA	8	NA	21	Med	No
School # 5	2	2	2	20	Med	Yes
School #25	NA	2	NA	26	Med	Yes
School # 6	2	5	1	14	High	No
School #26	NA	16	NA	39	Med	No
School # 7	2	12	2	20	Med	Yes
School #27	NA	7	NA	20	Med	Yes
School # 8	2	7	2	14	Med	Yes
School #28	NA	6	NA	16	Med	Yes
School # 9	1	5	1	18	Med	No
School #29	NA	2	NA	19	Med	No
School #10	1	4.5	1	24	Med	No
School #30	NA	2	NA	21	Med	No

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TABLE 2 (Continued)

CHARACTERISTICS OF SAMPLE SCHOOLS

Schools in Matching Pairs[1]	Number of Years as MUS-E	Tenure of Principal (Years)	Average Unit Leader Tenure	Number of Teachers in Building	SES Level	Pair in Same District
School #11	1	7	1	21	Low	Yes
School #31	NA	1	NA	30	Low	Yes
School #12	2	3	2	20	Med	No
School #32	NA	14	NA	23	Med	No
School #13	1.5[2]	3	1.5	18	Med	Yes
School #33	NA[2]	16	NA	21	Med	Yes
School #14	1.5[2]	4	1	19	Med	Yes
School #34	NA[2]	16	NA	18	Med	Yes
School #15	2[2]	17	2	20	Med	Yes
School #35	NA[2]	21	NA	13	Med	Yes
School #16	2	6	2	19	Med	No
School #36	NA	3	NA	20	Med	No
School #17	2	7	1	15	Med	No
School #37	NA	14	NA	31	Med	No
School #18	2	3	1	14	Med	No
School #38	-[3]	-	-	-	-	-
School #19	2[2]	3	1.5	22	Low	Yes
School #39	NA[2]	14	NA	17	Low	Yes
School #20	2[2]	10	2	12	Med	Yes
School #40	-[2,3]	-	-	-	-	-

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[1] Schools numbered 1-20 are MUS-E schools. Schools numbered 21-40 are non-MUS-E.

[2] These schools are from the same district.

[3] Did not return questionnaire.

been proposed by various organizational theorists. These approaches permit comparative research to be undertaken. Even though such research is less precise, it is of more theoretical interest and more of a challenge than research based on the more obvious characteristics of organizations.

Procedures for Data Collection

The schools which agreed to participate in the study were requested to submit a list of the teachers presently employed in the school. PROGRAM IRANDX[25] was used to select randomly ten teachers from thirty-eight of the school lists. Two non-multiunit schools did not submit lists; the contact person in the district requested that he be provided with a sufficient number of questionnaires for him to distribute. Questionnaires were then sent to each of the selected teachers through the principal. The principal's form of the ESSS was sent to each principal. The principals were instructed to make sure that the teacher's form of the questionnaire was distributed to the identified teachers since they had been randomly selected. Teachers were directed to complete the questionnaire, seal it in the envelope provided, and return it to the principal who would return all questionnaires to the investigator in a large postage paid envelope which was provided. In total, 400 copes of the teacher's form of the questionnaire and 40 copies of the principal's form of the questionnaire were distributed. Approximately two weeks after the ESSS was mailed, a telephone call was placed to each principal. The principal was asked if he would provide the number of elementary students in his district, the number of students in the building, the SES level of his school, and, if he were a multiunit principal, the average unit leader tenure in the building. These questions were asked in order to validate the information given earlier in selecting the sample schools. Before closing the conversation, the principal was asked about the progress made by the teachers in submitting completed questionnaires and was encouraged to complete the task if he had not already done so. The return rate of 93.7% for the teacher's questionnaire and 95.7% for the principal's questionnaire is indicated in Table 3.

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[25] Dennis W. Spuck and Donald N. McIsaac, PROGRAM IRANDX (Madison, Wisconsin: University of Wisconsin, Wisconsin Information Systems for Education, 1971).

Statistical Techniques Employed

As indicated earlier, the questionnaire consisted of two forms; one for building principals, and one for teachers. The principal's form consisted only of a check list of positions or specialties in the building, one of the measures for the variable complexity. The teacher's form consisted of seven subscales for the variables of complexity, centralization, formalization, stratification, instrumental job satisfaction, expressive job satisfaction, and adaptiveness. All except the subscales for complexity (including both principal's and teacher's forms) were Likert-type scales; the complexity subscales were nominal scales.

Scoring the Questionnaires

Since the unit of measure in this study was the school building but the questionnaires were completed by individual teachers, it was

TABLE 3

QUESTIONNAIRE RETURN RATE

School	Number Distributed		Number Returned		Percentage	
	Teachers	Principal	Teachers	Principal	Teachers	Principal
# 1	10	1	10	1	100	100
#21	10	1	10	1	100	100
# 2	10	1	9	1	90	100
#22	10	1	10	1	100	100
# 3	10	1	10	1	100	100
#23	10	1	10	1	100	100
# 4	10	1	10	1	100	100
#24	10	1	10	1	100	100
# 5	10	1	10	1	100	100
#25	10	1	10	1	100	100
# 6	10	1	10	1	100	100
#26	10	1	10	1	100	100
# 7	10	1	10	1	100	100
#27	10	1	10	1	100	100
# 8	10	1	10	1	100	100
#28	10	1	10	1	100	100
# 9	10	1	9	1	90	100
# 29	10	1	10	1	100	100
#10	10	1	10	1	100	100
#30	10	1	10	1	100	100

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TABLE 3 (Continued)

QUESTIONNAIRE RETURN RATE

School	Number Distributed		Number Returned		Percentage	
	Teachers	Principal	Teachers	Principal	Teachers	Principal
#11	10	1	10	1	100	100
#31	10	1	0	1	100	100
#12	10	1	10	1	100	100
#32	10	1	10	1	100	100
#13	10	1	10	1	100	100
#33	10	1	10	1	100	100
#14	10	1	10	1	100	100
#34	10	1	10	1	100	100
#15	10	1	10	1	100	100
#35	10	1	10	1	100	100
#16	10	1	10	1	100	100
#36	10	1	10	1	100	100
#17	10	1	10	1	100	100
#37	10	1	7	1	70	100
#18	10	1	10	1	100	100
#38	10	1	0	0	0	0
#19	10	1	10	1	100	100
#39	10	1	10	1	100	100
#20	10	1	10	1	100	100
#40	10	1	0	0	0	0
38 Schools	400	40	375	38	93.7%	95%

necessary to generate building scores for each of the subscales. Three schools returned less than ten questionnaires. Thus, it was decided to use the means of the teachers' responses as building scores rather than the sum of the teachers' responses.

The theory on which this study was based stipulates that some organizational structures are negatively associated with adaptiveness. For example, one of the axioms is that the higher the formalization, the lower the adaptiveness, or stated another way, organizations that are highly adaptive will also have low formalization. Therefore, the scoring of many of the items on the questionnaire was reversed. Another reason for reversing the scoring of many of the items is that some items were purposely stated in such a way that the meaning was the opposite of other questions in the subscale. An example may help to illustrate the point. In the formalization subscale, item 36 asked the respondent to indicate on a five-point scale the extent to which teachers could exercise discretion in adhering to school rules. The subsequent item (item 37) asked the respondent to indicate on a five-point scale the extent to which the rules were strictly enforced by the principal. On the five-point scale a "1" indicated that the condition was "definitely true" and a "5" indicated that the condition was "definitely false." If the teacher indicated that item 36 was definitely true, then formalization was low in that building. If a similar indication were marked for item 37, formalization was high for that building. Schools with low formalization had a high value on the formalization subscale and schools with high formalization had a low value on the formalization subscale.

Exploratory Activities

According to Hage's axiomatic theory of organizations, complexity can be measured in two ways. One way is to count the number of social positions or specialties in an organization. The second is the amount of professional preparation for the specialties. This latter measure is, in effect, representative of the amount of knowledge in the organization. To obtain information about the first measure, the principal's form was organized into four sections; administrative positions, teaching positions, pupil personnel positions, and auxiliary positions. The complexity subscale in the teacher's form was designed to elicit information about the amount of professional preparation and about professional activities such as attending professional conferences and special purpose workshops, professional membership, and professional reading. Since, in both forms, there is no basis by which the discrete elements within each measure can be summed to arrive at one score for each measure, some exploratory analyses were conducted after receipt of the questionnaires from the study sample to determine which of the elements was most strongly associated with adaptiveness. Both a cross tabulation procedure and a stepwise multiple regression procedure were used in this exploratory effort. As a result the number of administrative positions was selected to represent the number of specialties in the building, and the number of workshops attended in a year was selected to represent the professional preparation or amount of knowledge in the buildings.

In addition to data relative to the variables already enumerated, three measures of size were collected: number of elementary students in the district, number of students in the building, and number of teachers in the building. To determine which of these size measures was most closely associated with the dependent variable, exploratory analyses as described above were conducted. The results indicated that the number of teachers in the building was the strongest measure of size.

A factor analysis of the study sample response to the adaptiveness subscale was executed to describe more adequately the components of adaptiveness. According to Kerlinger, factors are presumed to be underlying unities behind the test or item performances. If two or more items are substantially correlated, then they are measuring something in common.[26] In other words, respondents perceived the items as though they were in some way related. Using PROGRAM BIGFACT[27] the analysis showed three factors. These were subsequently identified as a student activities factor, a teacher activities factor, and a traditional procedures factor. Apparently, the respondents in the study sample perceived the items in a manner quite different from the author's original conceptualization based on the literature review. The traditional procedures factor is a function of the fact that the adaptiveness subscale purposely contained items not considered to be individualization practices in order that teachers not develop a "response set" while responding to the adaptiveness subscale indicating that the items served their purpose. Consequently, this factor was eliminated from further analysis. The other two factors, student activities and teacher activities, were used both as separate measures of adaptiveness and in combination as a single measure of adaptiveness.

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[26] Kerlinger, op. cit., p. 651.

[27] Dennis W. Spuck, Donald N. McIsaac, and John A. Berg, PROGRAM BIGFACT (Madison, Wisconsin: University of Wisconsin, Wisconsin Information Systems for Education, 1972).

At the conclusion of these exploratory activities, eight independent variables and three dependent variables were established to be used in the analysis of the data. The independent variables were: complexity (two measures), centralization, formalization, stratification, instrumental job satisfaction, expressive job satisfaction, and size. The dependent variables were: student activities, teacher activities, and individualization.

Analysis of the Data

The relationship between properties of organizational structure and organizational adaptiveness and the extent to which each one of the structural variables is related to adaptiveness were analyzed using multiple regression techniques. Comparisons between the multiunit school-elementary organization and non-multiunit school organization on each of the independent and dependent variables were made using analysis of variance techniques. A comparison between the two types of elementary school organizations on the dependent measures alone was made with a Chi-square formula.

Multiple regression is essentially a technique for determining whether the value of a variable is dependent upon or at least related to the values of a set of other variables.[28] A multiple regression equation thus serves two purposes. It can determine whether there is a relationship between the dependent variable and a number of independent variables; it also can predict at least a portion of the value of the dependent variable. The equation in any one particular multiple regression model is based on the assumption that the relationships between the variables are linear. A multiple regression equation is in fact a multiple linear regression equation and any model is based on the hypothesis that the particular multiple correlation coefficient is equal to zero. If this hypothesis is not accepted, then one can proceed to consider whether the regression coefficients for each of the independent variables is not equal to zero.[29]

While the primary hypothesis of this study could have been analyzed using an ordinary multiple linear regression analysis, the related hypotheses concerning the relationship between each of the organizational structures and adaptiveness required a procedure that permitted an examination of the relationship of individual variables to the dependent variable. While these requirements suggested that a series of multiple regression models be analyzed, the results would not have given any indication of possible interactions among the independent variables. Therefore, a stepwise multiple linear regression procedure was utilized. Moreover, since there was no a priori basis for determining which of the independent variables help explain the dependent variable, a forward selection procedure was adopted without prescribing an inclusion or exclusion criterion.[30] With these options, the computations proceeded until all of the independent variables were entered into a regression equation. In effect, the final step in the stepwise procedure was equivalent to an ordinary multiple linear regression equation.

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[28] William L. Hays and Robert L. Winkler, STATISTICS: PROBABILITY, INFERENCE AND DECISION (New York, New York: Holt, Rinehart and Winston, Inc., 1971), p. 655.

[29] Elliot M. Cramer, SIGNIFICANCE TESTS AND TESTS OF MODELS IN MULTIPLE REGRESSION, Number 93 (Chapel Hill, North Carolina: University of North Carolina, The L. L. Thurstone Psychometric Laboratory, 1971), p. 3.

Each step in a stepwise regression procedure is essentially a separate regression model. To determine if each model's multiple correlation coefficient was greater than zero at $P<.05$, the following formula was applied:

$$F = \left(\frac{R^2}{1-R^2}\right)\left(\frac{N-K}{K-1}\right)$$

If the model passed this test, then the relationships of independent varibles to the dependent variable were assessed using the standardized regression coefficients. It was assumed that all of the variables were related to adaptiveness so the analysis proceeded to identify the statistical significance of the relationships.

To assess the amount of variance in the dependent variable attributable to the independent variables, a corrected coefficient of determination was utilized. DuBois has stated:

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[30] Frederick P. Stofflet under the direction of Dennis W. Spuck, PROGRAM WISE*LIB.SETSTP (Madison, Wisconsin: University of Wisconsin, Wisconsin Information Systems for Education, 1971), p. 9.

> In finding betas, observed correlations based upon the observed values of the variables are used. The weighting proceeds as though all variability were true variance. . . . In a subsequent sample, one would expect random error to be different. Accordingly, if the beta weights found in one sample are applied to the same predictors in another sample, it is to be expected that the correlation between the weighted sum of the predictor and criterion will descrease. This phenomenon is generally . . . known as the shrinkage of the multiple.[31]

The stepwise procedure used in this study already had built into it a procedure for correcting this tendency for betas based on one sample to be somewhat inflated.

In any study using multiple independent variables, one would expect that there would be some unknown interaction between the independent variables. To assess these interactions adequately, however, a relatively large N is required in the sample. In this study with an N of 38, the sample was too small to carry out any serious analysis of interactions. An attempt to identify interactions was made using an automatic interaction detector program,[32] but the sample proved too small for the results to be of consequence. However, the stepwise procedure permitted some assessment of interactions when all of the variables were allowed to enter the equations. Simply by noting the changes in the regression coefficients as new variables were entered, the presence of some kind of interaction could be detected.

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[31] Philip H. DuBois, AN INTRODUCTION TO PSYCHOLOGICAL STATISTICS (New York, New York: Harper and Row, Publishers, 1965), p. 185.

[32] John A. Sonquist, Elizabeth L. Baker, and James N. Morgan, SEARCHING FOR STRUCTURE (Ann Arbor, Michigan: University of Michigan, Institute for Social Research, 1971).

The actual stepwise computations used in this study were performend using the Madison Academic Computing Center's program STEPREG-1.[33]

The stepwise procedure was applied to the eight independent variables with each of the three dependent variables as described earlier. For each of the 24 models the F ratio was significant at .05 or better. However, there were some indications that simply being a multiunit school-elementary (MUS-E) accounted for some of the variance in the dependent variables, particularly teacher activities. This indication was particularly reflected in the plot of the standardized residuals provided after the final variable was entered into the regression equation. Accordingly, another independent variable, labeled MUS-E, was entered into the equations. Therefore, the presentation of the data in Chapter III will be based on the results of the analysis using nine independent variables. When appropriate, comparisons will be made with the analysis of the data when MUS-E was not entered.

To make comparisons of the performances of MUS-E schools and non-MUS-E schools on each of the independent and dependent variables, univariate F's were computed on the basis of the mean scores on each of the subscales for each type of school. The analyses were performed using Finn's MULTIVARIATE program at the Madison Academic Computing

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[33] Stofflet, op. cit.

Center.[34] In addition, a simple Chi-square was performed comparing the adaptiveness scores of each MUS-E and each non-MUS-E school with the mean adaptiveness scores for all schools. In this case, the Chi-square was used to determine whether the differences between the two observations could be attributed to chance.[35]

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[34] Jeremy D. Finn, NYBMUL: UNIVARIATE AND MULTIVARIATE ANALYSIS OF VARIANCE AND COVARIANCE (Buffalo, New York: The University of New York at Buffalo, Computing Center, 1968).

[35] DuBois, op. cit., p. 55.

CHAPTER III

PRESENTATION OF THE DATA

In this chapter, data will be presented relative to the hypotheses of the study. The first hypothesis was that there is no relationship between the properties of organizational structure and organizational adaptiveness. The question which followed from the first hypothesis was concerned with the extent to which any of the structural variables was related to adaptiveness. Thus, it was also hypothesized that there was no relationship between:

Complexity and adaptiveness;
Centralization and adaptiveness;
Formalization and adaptiveness;
Stratification and adaptiveness;
Instrumental job satisfaction and adaptiveness; and
Expressive job satisfaction and adaptiveness.

As discussed in Chapter I, some of these structures may be positively related to adaptiveness and some may be negatively related. In addition to the questions of relatedness of the structures (as a multivariate variable and singly) to adaptiveness, and the direction of relatedness, another question of interest was the amount of variance in the dependent variable which could be accounted for by the organizational structures. Data will be presented relative to these concerns.

As indicated in Chapter II, another exploration was to be conducted to determine differences between MUS-E schools and non-MUS-E schools. Data comparing the two types of schools will also be presented for all the structural variables and adaptiveness.

While the initial statement of hypotheses indicated six independent variables and one dependent variable, the exploratory analyses described in Chapter II resulted in the final analysis centering on nine independent and three dependent variables. In addition to the six independent variables enumerated above, a size variable and a variable labeled MUS-E were added. A factor analysis of the responses of teachers in the study sample to the adaptiveness subscale indicated three factors: student activities, teacher activities, and traditional procedures. For reasons described earlier, the third factor was omitted from the final analysis. The two remaining factors were conceptualized as components of individualization. Thus, three measures of adaptiveness were generated: student activities, teacher activities, and individualization (a combination of the first two). These three measures were treated as dependent variables.

Data will be presented first to show the validity of the statistical models employed in the stepwise multiple linear regression procedures. Second, the data presentation relative to the hypotheses of the study will be organized and presented in terms of the dependent variables. Finally, data comparing MUS-E schools with non-MUS-E schools will be presented.

Test of the Stepwise Multiple Linear Regression Models

The purposes of testing the statistical model used in the analysis of the data is to determine whether, in fact, there was an appropriate fit between the data and the model and, in the case of stepwise multiple linear regression, whether the hypothesized relationships were, in fact, linear. In this study with nine independent variables (the variable complexity had two measures, each treated as one variable) and three dependent variables, a total of twenty-seven models was generated. The tests of the models were calculated using the following formula:

$$F = \left(\frac{R^2}{1-R^2}\right)\left(\frac{N-K}{K-1}\right)$$

If the tests for the F ratios were found to be significant at the .05 level or less, the model was accepted and analysis proceeded. Table 4 represents the results of these tests.

Clearly, all models passed the test. That is, R^2 is not equal to 0 at the prescribed level of significance. Relationships are linear and the data fit the models.

Adaptiveness: Student Activities

Table 5 shows the results of the final step in the stepwise regression with student activities as the measure of adaptiveness. All of the structural variables are operating at the same time in any one organization and this final model reflects such a condition.

TABLE 4

TESTS OF STEPWISE MULTIPLE REGRESSION MODELS

Dependent Variable/Steps	Partial F-Value	Degrees of Freedom	Significance Level
Adaptiveness: Student Activities			
Step 1	10.35	1 & 36	.0027
Step 2	7.35	2 & 35	.0022
Step 3	6.86	3 & 34	.0010
Step 4	6.25	4 & 33	.0007
Step 5	6.63	5 & 32	.0002
Step 6	6.09	6 & 31	.0003
Step 7	5.42	7 & 30	.0004
Step 8	4.59	8 & 29	.0011
Step 9	3.96	9 & 28	.0024
Adaptiveness: Teacher Activities			
Step 1	52.56	1 & 36	.0000
Step 2	29.71	2 & 35	.0000
Step 3	21.35	3 & 34	.0000
Step 4	17.50	4 & 33	.0000
Step 5	14.55	5 & 32	.0000
Step 6	12.58	6 & 31	.0000
Step 7	11.59	7 & 30	.0000
Step 8	10.33	8 & 29	.0000
Step 9	8.87	9 & 28	.0000

-CONTINUED-

TABLE 4 (Continued)

TESTS OF STEPWISE MULTIPLE REGRESSION MODELS

Dependent Variable/Steps	Partial F-Value	Degrees of Freedom	Significance Level
Adaptiveness: Individualization			
Step 1	22.11	1 & 36	.0000
Step 2	13.49	2 & 35	.0000
Step 3	11.31	3 & 34	.0000
Step 4	10.15	4 & 33	.0000
Step 5	8.87	5 & 32	.0000
Step 6	8.04	6 & 31	.0000
Step 7	8.31	7 & 30	.0000
Step 8	7.15	8 & 29	.0000
Step 9	6.31	9 & 28	.0001

TABLE 5

FINAL MODEL WITH ALL INDEPENDENT VARIABLES AND STUDENT ACTIVITIES AS MEASURE OF ADAPTIVENESS

Variable	Standardized Regression	Partial Correlation	Partial F Value	Significance of Partial F-Ratio	Corrected Coefficient of Determination
Size	-.1543	-.203	1.20841	.2810	.4187
Complexity (# of Administrative Positions)	-.3043	-.371	4.45949	.0438	
Complexity (# of Special Purpose Workshops)	.2011	.258	2.00413	.1679	
Centralization	.3175	.381	4.75691	.0377	
Formalization	-.0483	-.056	.08660	.7707	
Stratification	-.3623	-.457	7.39088	.0111	
Instrumental Job Satisfaction	.2365	.243	1.75171	.1964	
Expressive Job Satisfaction	.0531	.051	.07359	.7882	
MUS-E	.0948	.107	.32271	.5745	

Three variables, complexity (in terms of the number of administrative positions in the organization), centralization, and stratification, had reliability coefficients different from zero at $P \leq .05$ level of significance. Three variables -- formalization, expressive job satisfaction, and MUS-E -- had reliability coefficients different from zero which could be expected to occur by chance more than 50 percent of the time. Strictly speaking, in terms of the theory upon which this study was based, MUS-E is not a structural variable. Nonetheless, as subsequent data and discussion will show, elementary schools organized as MUS-E's were more adaptive even though they were similar in structure to non-MUS-E schools.

Organizational Structure and Adaptiveness

When adaptiveness is considered in terms of student activities, there was a relationship between the properties of organizational structures and organizational adaptiveness. The primary hypothesis of this study was rejected when adaptiveness was related to the kinds of activities students are engaged in and which activities account for the variations among and between children. Not only was there a relationship between structure and adaptiveness, but when all the variables were treated as one multivariate variable, they accounted for 41.87 percent of the variance in adaptiveness.

Individual Structural Variables and Adaptiveness

The secondary set of hypotheses was concerned with the relationship of each of the structural variables to adaptiveness. Although the direction of the relationship of these variables to adaptiveness was not specified in the hypothesis, direction of relationship was of interest in terms of the theoretical basis for the study. Table 5 presents the information which describes both the relationship and the direction of each of the variables when all of the variables are present in the equation. In such a situation, which is a statistical model of an operating organization, three of the structural variables were related to adaptiveness. These were complexity (when measured by the number of administrative positions), centralization, and stratification. Four variables, complexity (when measured by the number of special purpose workshops attended by teachers), formalization, instrumental job satisfaction, and expressive job satisfaction were not related to adaptiveness at $P \leq .05$ level of significance. However, the relationship between instrumental job satisfaction and complexity (measured by the number of special purpose workshops attended), and adaptiveness would occur by chance 19.6 percent and 16.8 percent of the time, respectively. While the relationship (expressed in terms of the standardized regression coefficient) of these variables was not significant at the conventional level, there was, nonetheless, a relationship.

Of the three variables which were considered related to adaptiveness, two were in the direction opposite that indicated by Hage's axiomatic theory of organizations. Theoretically, the higher the complexity (regardless of which indicator is measured) the higher the adaptiveness. In this study, complexity, as measured by the number of administrative positions, was negatively related to adaptiveness. With regard to centralization, the theory indicated that the higher the centralization, the lower the adaptiveness. In this study, centralization was positively related to adaptiveness.

As indicated in Chapter II, the question of interaction among or between variables could not be adequately pursued in this study due to the small sample size. The stepwise procedure, however, provided some indication about possible interactions. The interactions of interest were related to those variables which, when entered into the equations, had regression coefficients different from zero at $P \leq .05$ level of significance, but whose regression coefficients were different from zero at $P > .05$ in the final equation. Conversely, variables whose regression coefficients, when entering the equation, differed from zero at $P > .05$, but whose regression coefficients differed from zero at $P \leq .05$ in the final equation were also of interest. Table 6 presents the relevant information (see Appendix D for a correlation table).

One variable, stratification, entered the equation at the prescribed level of significance and, as other variables were included, the significance of its regression coefficient increased. Two variables were included into the equations at significant levels, but as other variables were included, their significance level decreased. In the case of the variable, MUS-E, the decrease was rather dramatic. The variables, centralization and complexity (number of administrative positions), were included in the equations at less than the prescribed level of significance, but as other variables were included, the significance level of their regression coefficients improved and in the final equation were better than the prescribed level. Clearly, some

TABLE 6

CHANGES IN SIGNIFICANCE LEVEL OF REGRESSION COEFFICIENTS OF SELECTED VARIABLES BETWEEN STEP ENTERED AND FINAL EQUATION

Variables (in order of inclusion into equations)	Standardized Regression Coefficients		Partial F Value		Change in Corrected Coefficient of Determination	Significance Level	
	at Entering Step	at Step 9	at Entering Step	at Step 9		at Entering Step	at Step 9
MUS-E	(1)* .4726	.0948	10.35	.32	.2017	.0027	.5745
Centralization	(2) .3042	.3175	3.60	4.76	.0537	.0662	.0377
Stratification	(3) -.2882	-.3623	4.45	7.39	.0668	.0424	.0111
Complexity (# of Administrative Positions)	(4) -.2467	-.3043	3.13	4.46	.0399	.0862	.0438
Instrumental Satisfaction	(5) .3030	.2365	5.06	1.75	.0698	.0316	.1964

*Number in parenthesis indicates the step at which the variable entered the equation

of the variables were interacting. Some of the variance attributable to the variable, MUS-E, when it is entered into the equation alone, was also attributable to the other variables as they were entered.

Adaptiveness: Teacher Activities

Table 7 presents the results of the final step in the stepwise regression with teacher activities as the measure of adaptiveness. This final model reflects the situation where all structrual variables in an organization are operating simultaneously.

In this model, only two variables, stratification and MUS-E, have regression coefficients different from zero at $P \leq .05$ level of significance. However, two other variables, size and formalization, have regression coefficients that approach that level, .051 and .055, respectively. Since size and MUS-E are not considered structural variables in this study, only one variable, stratification, showed a significant regression coefficient.

Organizational Structure and Adaptiveness

When adaptiveness is conceptualized in terms of the kinds of activities carried out by teachers to adapt instruction to the differing characteristics among children, there was a relationship between organizational structure and organizational adaptiveness. Again, the primary hypothesis of this study was rejected. Even though only one structural variable was related at a significant level, one other variable was sufficiently close to significance as to be considered strongly related

TABLE 7

FINAL MODEL WITH ALL INDEPENDENT VARIABLES AND TEACHER ACTIVITIES AS MEASURE OF ADAPTIVENESS

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value	Significance Level	Corrected Coefficient of Determination
Size	-.2195	-.359	4.14054	.0514	.6568
Complexity (# of Administrative Positions)	-.1073	-.180	.93873	.3409	
Complexity (# of special purpose workshops attended per year)	.1659	.276	2.31160	.1396	
Centralization	.1310	.216	1.37198	.2513	
Formalization	-.2522	-.354	4.00054	.0553	
Stratification	-.2255	-.384	4.84935	.0361	
Instrumental Job Satisfaction	-.0115	-.016	.00696	.9341	
Expressive Job Satisfaction	.2289	.276	2.31405	.1394	
MUS-E	.5070	.599	15.64459	.0005	

for practical purposes. In addition, when all the variables were treated as one multivariate variable, they accounted for 65.68 percent of the variance in adaptiveness.

Individual Structural Variables and Adaptiveness

Table 7 presents information which describes both the relationship and the direction of the relationship when each variable is considered with all of the variables present in the equation. One of the structural variables of interest in the study was significantly related: stratification. Another variable, formalization, was close enough that it too was considered to be related to adaptiveness. In the set of secondary hypotheses, two were rejected and four were accepted. However, the relationship (expressed as the standardized regression coefficient) of complexity, when measured as the number of special purpose workshops attended in a year, and expressive job satisfaction to adaptiveness (teacher activities) was relatively strong. Only 14 percent of the time would the regression coefficient for both variables be different from zero by chance.

With regard to direction of the relationship between stratification and adaptiveness, the direction was that suggested by Hage's axiomatic theory of organizations. Hage's formulation was that the lower the stratification, the higher the adaptiveness. With regard to the variables of formalization, complexity (number of special purpose workshops attended in a year), and expressive job satisfaction, the relationship of formalization and complexity to adaptiveness was in the correct direction but that of expressive job satisfaction was in the opposite.

In this particular series of stepwise multiple regression models, one variable was entered into the equations at $P \leq .05$ level of significance: MUS-E, and remained at that level through the nine models. Two variables, stratification and formalization, entered the equation at a significance level of .1348 and .1088, respectively, but in the final equation, had significance levels of .0361 and .0553. Table 8 presents the relevant information.

There is evidence of interaction among the variables. With the exception of the complexity and MUS-E variables, the inclusion and presence of other variables had some effect on the variables in question, moving them toward significance.

Adaptiveness: Individualization

Table 9 presents the results of the final step in the stepwise multiple regression with individualization as the measure of adaptiveness. In a sense, this measure of adaptiveness was the measure of primary concern in this study. In Chapter I, adaptiveness was operationally defined for this study as the activities carried out in an elementary school in response to the differing characteristics of the children they serve. In other words, schools were adaptive when they individualized their instructional programs.

In this model, three independent variables, complexity (measured by the number of adminstrative positions), centralization, and stratification, had regression coefficients different from zero at $P \leq .05$ level of significance. A fourth variable, complexity (measured by the

TABLE 8

CHANGES IN SIGNIFICANCE LEVEL OF REGRESSION COEFFICIENTS OF SELECTED VARIABLES BETWEEN STEP ENTERED AND FINAL EQUATION

Variables (in order of inclusion into equations)	Standardized Regression Coefficients		Partial F Value		Change in Corrected Coefficient of Determination	Significance Level	
	at Entering Step	at Step 9	at Entering Step	at Step 9		at Entering Step	at Step 9
MUS-E	(1)* .7704	.5070	52.56	15.64	.5822	.0000	.0005
Size	(2) -.1976	-.2195	3.39	4.14	.0260	.0743	.0514
Stratification	(3) -.1572	-.2255	2.35	4.85	.0145	.1348	.0361
Formalization	(4) -.1635	-.2522	2.72	4.00	.0181	.1088	.0553
Expressive Job Satisfaction	(6) .1402	.2289	1.52	2.31	.0057	.2269	.1394
Complexity (# of Special Purpose Workshops)	(7) .1591	.1659	2.35	2.31	.0145	.1358	.1396

*Number in parenthesis indicates the step at which the variable entered the equation

TABLE 9

FINAL MODEL WITH ALL INDEPENDENT VARIABLES AND INDIVIDUALIZATION AS MEASURE OF ADAPTIVENESS

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value	Significance Level	Corrected Coefficient of Determination
Size	-.1898	-.283	2.43447	.1299	.5634
Complexity (# of Administrative Positions)	-.2566	-.362	4.22170	.0493	
Complexity (# of special purpose workshops attended per year)	.2039	.299	2.74446	.1088	
Centralization	.2746	.380	4.73847	.0381	
Formalization	-.1258	-.165	.78205	.3840	
Stratification	-.3408	-.487	8.71006	.0063	
Instrumental Job Satisfaction	.1651	.198	1.13703	.2954	
Expressive Job Satisfaction	.1208	.133	.50662	.4825	
MUS-E	.2512	.312	3.01832	.0933	

special purpose workshops attended per year) had a regression coefficient that was different from zero at .1088 level of significance. In other words, this difference from zero would occur by chance only 11 percent of the time. While not acceptable at the prescribed level of significance, this measure of complexity is nonetheless strongly related to adaptiveness.

Organizational Structure and Adaptiveness

When adaptiveness is conceptualized in terms of the variety of activities engaged in by students and the kinds of activities carried out by teachers to respond to the varying characteristics of children, i.e., individualization, there was a relationship between organizational structure and organizational adaptiveness. The primary hypothesis of this study was rejected. Three structural variables were significantly related and a fourth was related for all practical purposes. When all the variables were treated as one multivariate variable, they accounted for 56.34 percent of the variance in adaptiveness.

Individual Structural Variables and Adaptiveness

Table 9 presents the information which describes both the relationship and direction of the relationship when each variable is considered with all of the variables present in the equation. Three of the structural variables were significantly related and a fourth was sufficiently close to significance that it was considered related. In the set of secondary hypotheses, three were rejected, one was conditionally rejected, and three were accepted.

In the matter of direction of the variables considered to be related to adaptiveness, two were in the direction suggested by the axiomatic theory of organizations and two were in the opposite direction. Complexity (measured by the number of administrative positions) and centralization were in the opposite direction. The axiomatic theory postulates that complexity is positively related to adaptiveness and that centralization is inversely related. In this study, however, complexity (measured by the number of administrative positions) was inversely related and centralization was positively related. The axiomatic theory posits that stratification will be associated negatively with adaptiveness. In this study, this direction was confirmed. In addition, complexity (when measured by the number of special purpose workshops) was related to adaptiveness in the direction specified by the theory.

Table 10 presents information relative to the interaction of the variables that were considered related to adaptiveness. In addition, the variable, MUS-E, is included since it entered the series of models first at a highly significant level and accounted for most of the variance in adaptiveness. However, in the last model, its regression coefficient was no longer significant at the prescribed level.

With the exception of the variable MUS-E, the significance level of all the other variables of interest improved as other variables were entered into equations. On the other hand, as the other variables entered the regression equations, the significance of the regression coefficient for MUS-E was substantially reduced indicating that although

TABLE 10

CHANGES IN SIGNIFICANCE LEVEL OF REGRESSION COEFFICIENTS OF SELECTED VARIABLES BETWEEN STEP ENTERED AND FINAL EQUATION

Variables (in order of inclusion into equations)	Standardized Regression Coefficients		Partial F Value		Change in Corrected Coefficient of Determination	Significance Level	
	at Entering Step	at Step 9	at Entering Step	at Step 9		at Entering Step	at Step 9
MUS-E	(1)* .6168	.5070	22.11	3.02	.3632	.0000	.0933
Centralization	(2) .2647	.2746	3.40	4.74	.0398	.0738	.0381
Stratification	(3) -.2557	-.3408	4.36	8.71	.0522	.0444	.0063
Complexity (# of Special Purpose Workshops)	(5) .1740	.2039	2.23	2.74	.0182	.1448	.1088
Complexity (# of Administrative Positions)	(6) -.1797	-.2566	2.20	4.22	.0175	.1480	.0493

*Number in parenthesis indicates the step at which the variable entered the equation

the MUS-E is an important variable, its relationship to adaptiveness is less important when other variables are entered into the equation.

The Effect of MUS-E

As the preceding tabulation of data and discussion reveal, MUS-E appeared to be an important variable in accounting for the variance in adaptiveness. In all three stepwise procedures, MUS-E was the variable entered first and accounted, when entered alone, for the largest percent of the total variance accounted for by the independent variables. In the analysis with adaptiveness considered as individualization and all the variables entered into the equation, the partial correlation coefficient of the variable MUS-E was exceeded only by the three variables shown to be significantly related to the dependent variable.

The difference in direction of the relationship for the variable of complexity (measured by the number of administrative positions) was in part explainable as a function of the MUS-E variable. A look at the raw scores of all the schools in the sample indicated that MUS-E's as a group might be more adaptive than non-MUS-E schools. To determine whether such was the case, a simple Chi-square formula was computed. The hypothesis of concern in this computation was that on the basis of chance, half of each type of school would be above the grand mean for adaptiveness considered as individualization and half would be below the grand mean. The formula[1] used in this case was:

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[1] Phillip H. DuBois, AN INTRODUCTION TO PSYCHOLOGICAL STATISTICS (New York, New York: Harper and Row, Publishers, 1965), p. 185.

$$x^2 = N\left[\sum\left(\frac{fo^2}{frfc}\right)-1\right]$$

where fo is the number of observed frequencies,

fr is the frequencies in the rows, and

fc is the frequences in the columns.

Yate's correction for continuity was utilized since the observed frequencies in one of the cells was less than five. Table 11 gives the raw scores of the schools on the adaptiveness subscale. Since two of the MUS-E schools did not have a matching school, only the 18 MUS-E schools with matching non-MUS-E schools were used. As Table 11 shows, thirteen MUS-E schools were above the grand mean, five were below; four non-MUS-E schools were above the grand mean, and fourteen were below. The Chi-square calculated in this case was 5.4504. A score of 5.412 with one degree of freedom would be significant at $P \leq .02$ level. Thus, it was concluded that the MUS-E schools were significantly more adaptive than the non-MUS-E schools.

Given the significantly higher adaptiveness of MUS-E schools and the observations that only one MUS-E school had more than one administrative position and seven of the eighteen non-MUS-E schools had more than one administrative position, it became clear that the inverse relationship of this measure of complexity to adaptiveness can be explained by the influence of the MUS-E schools. This finding was further evidence that led to the conclusion to treat MUS-E as an independent variable.

As indicated in Chapter II, some exploratory analyses were executed. One of these involved execution of STEPREG1 without the variable, MUS-E. With individualization used as the measure of adaptiveness, the

TABLE 11

COMPARISON OF MUS-E AND NON-MUS-E ADAPTIVENESS SCORES WITH GRAND MEAN OF ADAPTIVENESS SCORES

(Adaptiveness When Considered as Individualization)

MUS-E Schools			Non-MUS-E Schools		
School Id.	Score	Above Grand Mean = + Below Grand Mean = -	School Id.	Score	Above Grand Mean = + Below Grand Mean = -
1	116.0	+	21	99.1	-
2	103.0	+	22	102.2	+
3	108.2	+	23	93.2	-
4	115.6	+	24	92.7	-
5	96.1	-	25	89.9	-
6	107.7	+	26	92.3	-
7	105.6	+	27	96.7	-
8	101.1	+	28	100.6	+
9	112.0	+	29	96.9	-
10	108.3	+	30	103.8	+
11	106.9	+	31	87.7	-
12	107.5	+	32	94.8	-
13	97.3	-	33	86.9	-
14	90.4	-	34	91.0	-
15	100.7	+	35	103.0	+
16	93.4	-	36	93.4	-
17	97.6	-	37	83.3	-
19	100.9	+	39	91.5	-

Grand Mean = 99.577

differences in the results of the multiple regression equation with all of the variables entered are presented in Table 12. The presence of the variable, MUS-E had a tendency to reduce the effect of all the other variables except instrumental job satisfaction, and to account for more of the variance in adaptiveness.

A Comparison of MUS-E and Non-MUS-E Schools

This study which explored the relationship between certain structural variables and the adaptiveness of elementary schools also provided an opportunity to compare the differences between MUS-E schools and non-MUS-E schools on all of the variables, both independent and dependent. Since the types of schools in the sample were not selected randomly and the selection of the MUS-E school, in effect, determined the selection of the non-MUS-E schools, a one-way randomized block design with two independent variables was utilized in the analysis of variance. One independent variable was the condition of MUS-E and non-MUS-E and the other was sites. The analysis was conducted in such a manner as to control for site. Using the structural variables and the three measures of adaptiveness as dependent variables, the statistical hypothesis for each model was that there was no difference between the residuals for each type of school after the residuals for the block variable (site) were accounted for. The significance of the F Ratio was determined with 1 and 17 degrees of freedom (18 pairs of schools were compared). The results are presented in Table 13.

TABLE 12

COMPARISON OF TWO MULTIPLE LINEAR REGRESSION EQUATIONS WHEN THE VARIABLE MUS-E IS INCLUDED AND WHEN IT IS NOT INCLUDED*

Variable	Standardized Regression Coefficient		Partial Correlation Coefficient		Partial F Value		Significance Level		Corrected Coefficient of Determination	
	1**	2**	1	2	1	2	1	2	1	2
Size	-.2263	-.1898	-.321	-.283	3.33560	2.43447	.0781	.1299	.5330	.5634
Complexity (# of Administrative Positions)	-.3162	-.2566	-.428	-.362	6.48830	4.22170	.0164	.0493		
Complexity (# of Special Purpose Workshops)	.2393	.2039	.334	.299	3.63137	2.74446	.0667	.1088		
Centralization	.3622	.2746	.490	.380	9.17402	4.73847	.0051	.0381		
Formalization	-.1835	-.1258	-.232	-.165	1.64692	.78205	.2095	.3840		
Stratification	-.3793	-.3408	-.515	-.487	10.46866	8.71006	.0030	.0063		
Instrumental Job Satisfaction	.1497	.1651	.171	.198	.87707	1.13703	.3567	.2954		
Expressive Job Satisfaction	.2253	.1208	.247	.133	1.88288	.50662	.1805	.4825		
MUS-E	NA	.2512	NA	.312	NA	3.01832	NA	.0933		

*Significance Level of F-Ratio for both models was .0001

TABLE 13

TESTS OF MUS-E VERSUS NON-MUS-E REMOVING EFFECT DUE TO BLOCKING VARIABLE (SIZE)

Variable	MS_{hyp}	MS_{err}	F	P
Size	64.0000	28.235304	2.2667	.1506
Complexity (# of Administrative Positions)	1.3611	.419935	3.2412	.0896
Complexity (# of Special Purpose Workshops)	1.2321	1.312403	.9388	.3462
Centralization	95.8441	5.978632	16.0311	.0010
Formalization	.9280	1.091103	.8505	.3694
Stratification	.3927	14.718967	.0267	.8722
Instrumental Job Satisfaction	10.5842	9.885713	1.0707	.3153
Expressive Job Satisfaction	5.9211	1.508439	3.9253	.0640
Adaptiveness: Student Activities	235.7249	18.176354	12.9688	.0023
Adaptiveness: Teacher Activities	163.6268	3.035275	53.9084	.0001
Adaptiveness: Individualization	792.1412	28.774913	27.5289	.0001

On only one structural variable was there a significant difference: centralization. MUS-E schools in the study were less centralized.

On all three dependent variables, the differences were highly significant; MUS-E schools were more adaptive. Table 14 presents the means for MUS-E and non-MUS-E schools on these four variables.

TABLE 14

COMPARISON OF MUS-E AND NON-MUS-E MEAN SCORES ON FOUR SELECTED VARIABLES

	Centralization	Adaptiveness: Student Activities	Adaptiveness: Teacher Activities	Adaptiveness: Individualization
MUS-E	24.8435	73.4795	30.7605	104.2400
Non-MUS-E	21.5794	68.0817	26.3144	94.3961

CHAPTER IV

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

In this chapter, a brief overview of the nature of the study will be presented, followed by a summary of the findings and a presentation of the conclusions. Implications drawn from the study for theory, research, and practice will also be presented.

Overview of the Study

The purpose of this study was to examine the organizational structures of elementary schools in terms of their complexity, centralization, formalization, stratification, and job satisfaction and to analyze the relationship of these structures to the adaptiveness of elementary schools. Adaptiveness was defined in terms of the efforts put forth by elementary school staffs to adapt instructional programs to the differences that may be identified among children, i.e., to individualize instruction.

Organizations can be studied from a number of perspectives. One approach is to view them in terms of the characteristics of individuals within organizations — a psychological perspective. The social-psychological perspective tends to view organizations in terms of behavior in group settings. A third perspective, the sociological view, approaches the study of organizations in terms of social structures, or social positions in collection. The perspective chosen for this study was sociological and the framework for this study was Hage's axiomatic theory of organizations.[1]

An organization is a structured and coordinated collectivity of individuals engaged in activities related to a set of goals. The organization may be flexible or rigid in pursuit of its goals. Hage viewed organizational structures and the organization's degree of flexibility as means and ends respectively. Hage outlined four variables related to means (structures) and four variables related to ends (performance of functioning variables). In his view, the means, or structures, were termed complexity, centralization, formalization, and stratification; the ends, or performance variables, were adaptiveness (organizational flexibility), job satisfaction, production, and efficiency. This study was concerned only with the four means and the two ends of adaptiveness and job satisfaction. The four means and job satisfaction were treated as independent variables and adaptiveness was the dependent variable.

According to Hage, complexity has two measures: the number of occupations or specialties in an organization and the length of time required to train the person in the specialty. Essentially, complexity represents the extensiveness and intensiveness of knowledge in the organization. The higher the complexity in an organization, the higher the adaptiveness of the organization, according to the theory. In order to measure complexity in an elementary school setting which ordinarily does not have more than a principal, teachers, and perhaps some paraprofessionals on a full-time basis, specialists such as social workers, counselors, and psychologists who spent at least one-fourth of their time in the building were counted. With regard to length of training, personnel in a building were likely to have very similar amounts of professional preparation, thus the introduction of new knowledge is likely to be the result of professional activities such as attending workshops and conferences and reading professional literature. Consequently, information was gathered about such professional activities.

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[1] Jerald Hage, "Axiomatic Theory of Organizations," ADMINISTRATIVE SCIENCE QUARTERLY, 10 (December, 1965).

Centralization is measured by two indicators: the proportion of jobs that participate in decision making and the number of areas in which decisions are made. The lower the proportion of specialties that participate in decision making and the fewer the areas in which they can make decisions, the higher the centralization of the organization. As the number of specialties that participate in decision making decline, there is likely to be less knowledge or information input into the decisions. Thus, according to the theory, the higher the centralization, the lower the adaptiveness of the organization. Since there are relatively few positions in an elementary school, the first indicator of centralization was not considered appropriate for this study. Therefore, the measure of centralization used in this study was the number of areas in which teachers were allowed to make decisions.

The structural construct of formalization is related to the explicitness by which performance is directed through rules and regulations. The more discretion position occupants are allowed in performance of their responsibilities, the lower the formalization. When performance is highly prescribed or proscribed, there is little latitude to implement new ideas and procedures. Thus, the theory stipulates that the higher the formalization, the lower the adaptiveness. The measure of formalization used in this study was the extent to which teachers perceived themselves to be restricted in adhering to such rules as may exist in the school.

Stratification refers to the extent to which rewards are distributed in the organization. These rewards result in status differences. The more easily reward symbols are attained, the more open is the system. Conversely, the more difficulty there is in earning the symbols, the more closed or stratified is the organization. When important rewards are controlled by a few persons, as would be the case in a highly stratified organization, then persons seeking attainment of the rewards are not likely to engage in behavior contrary to the expectations of those distributing the rewards. Since new ideas are often disruptive to the status quo, persons in a stratified organization are reluctant to propose new techniques, procedures, and ideas that may be so perceived. Thus, according to Hage, the higher the stratification, the lower the adaptiveness. The indicator of stratification used in this study was the extent to which teachers felt that other teachers have greater status, prestige, or are given preferential treatment.

Job satisfaction was included in this study as an independent variable representing the human element within organizations. It is a summary measure of many aspects associated with employment including salary, achievement of professional or career expectations, pace of work, hours, and facilities. There are two dimensions to job satisfaction. One dimension is the satisfaction with the tasks to be performed (instrumental job satisfaction) and the other with personal or social relations with peers and supervisors (expressive job satisfaction). Persons who are satisfied with working conditions are likely to think of new ways of carrying out their responsibilities. However, the introduction and implementation of new ideas may cause peers who see themselves as adversely affected by the new procedure or technique to disassociate themselves socially or personally from the initiator of the new ideas. Consequently, the axiomatic theory suggests that the higher the instrumental job satisfaction, the higher the adaptiveness and the higher the adaptiveness, the lower the expressive job satisfaction. In this study, job satisfaction was measured by questions related to specific working conditions and to social relationships.

Adaptiveness, the dependent variable in this study, was viewed by Hage in relation to the organization's environment. In other words, an organization is adaptive when it responds to actual or perceived changes in the environment. Another way of describing adaptiveness is to refer to innovation or change. In essence, then, adaptiveness and innovation are equivalent. With regard to service oriented organizations such as schools, adaptiveness or innovation is related to providing better services to clients, an important element in an organization's environment. Therefore, a school is adaptive to the extent that it responds to the needs of its clients, the children who attend the school. When schools implement individualization procedures, they are in effect adapting both student activities and teacher activities to the needs of the students. In this study, adaptiveness was measured by gathering information relative to the occurrence of student activities and teacher activities that are generally recognized as good practices of individualized instruction.

The hypotheses for the study, based on Hage's axiomatic theory of organizations and a review of the literature, were:

1. There is no relationship between the properties of organizational structure and organizational adaptiveness
2. There is no relationship between complexity and adaptiveness
3. There is no relationship between centralization and adaptiveness
4. There is no relationship between formalization and adaptiveness
5. There is no relationship between stratification and adaptiveness
6. There is no relationship between instrumental job satisfaction and adaptiveness
7. There is no relationship between expressive job satisfaction and adaptiveness

The unit of analysis was an elementary school. Since the theory is conceptualized in such a manner as to be applicable to all organizations regardless of size, type, or wealth, it was decided to also use this study to compare the Multiunit School-Elementary (MUS-E) type of school organization with elementary schools not so organized. The sample of 20 MUS-E schools and 18 matching non-MUS-E schools was drawn from school districts in fourteen states which had implemented the MUS-E. With regard to the hypotheses of the study, analysis of the data from all 38 schools was conducted using a stepwise multiple regression procedure and the comparison between the two types of elementary school organizations on all the variables was conducted using analysis of variance techniques.

Summary of the Findings

With regard to the hypotheses, the main findings of the study were as follows:

1. There was a relationship between the properties of organizational structure and organizational adaptiveness, regardless of whether adaptiveness was measured in terms of student activities, teacher activities, or individualization (student activities and teacher activities combined). This relationship was especially true with regard to complexity (measured by the number of administrative positions), centralization, and stratification.

2. There was a negative relationship between complexity (measured as the number of administrative positions) and adaptiveness when measured as student activities and as individualization. There was no relationship between this measure of complexity and adaptiveness when measured as teacher activities. There was no relationship between complexity when measured as the number of special purpose workshops attended per year by teachers and any of the measures of adaptiveness.

3. There was a positive relationship between centralization and adaptiveness when measured as student activities and as individualization. There was no relationship between centralization and adaptiveness when measured as teacher activities.

4. There was no relationship between formalization and any of the three measures of adaptiveness. Although with regard to adaptiveness when measured as teacher activities, the measured negative relationship was just short of being statistically significant (P = .0553).

5. There was a negative relationship between stratification and all three measures of adaptiveness.

6. There was no relationship between instrumental job satisfaction and all three measures of adaptiveness.

7. There was no relationship between expressive job satisfaction and all three measures of adaptiveness.

With regard to the comparison between MUS-E schools and non-MUS-E schools, the main findings of the study were as follows:

1. There was a difference between the two types of organizations on the variable centralization and all three measures of adaptiveness. All differences were in favor of the MUS-E type of organization.

2. There was no difference between the two types of elementary school organizations on the variables complexity (both measures), formalization, stratification, instrumental job satisfaction, and expressive job satisfaction.

Conclusions

The data gathered and analyzed in this study indicated that there was a relationship between organizational structures and adaptiveness in elementary schools when adaptiveness is defined as activities carried out in response to identified needs or differing characteristics of the children served by the schools. These relationships, however, were not always in the direction specified by the axiomatic theory of organizations.

Complexity and Adaptiveness

Essentially, the construct of complexity represents the extensiveness and intensiveness of knowledge in the organization. It is theorized to be positively related to adaptiveness upon the assumption that problems can be resolved more creatively when perspectives from many specialties are brought to bear on the problems and that more knowledge is available to the organization when longer pre-entry training is required for the specialties. Thus, the more specialties there are and the more training each requires, the higher the complexity in the organization, and consequently, the higher the adaptiveness.

In this study, two indicators of complexity were used. One indicator was the number of administrative positions in an elementary school building. As a result of some exploratory analysis, this particular measure was adopted as a proxy for all the specialties that may exist in an elementary school. The second indicator of complexity was the number of special purpose workshops attended per year by the teachers. This measure was a proxy for length of training. The first indicator was the only one found to be related to adaptiveness, although the relationship was negative rather than positive as suggested by the theory.

There are two possible explanations for these findings. First, the negative relationship between complexity as measured by the number of administrative positions and adaptiveness was quite likely a function of the fact that MUS-E schools which, as a group, had fewer administrative positions, were also more adaptive on all three measures of adaptiveness. Second, as a rule, elementary school buildings have very few different specialties on the fulltime staff. Generally, the fulltime staff consists of three specialties: administrator, teacher, and teacher aide or paraprofessional. Other specialties such as counselor, social worker, and psychologist spend only a portion of their time in the building and this time is devoted only to those students with needs that can be met only by these specialties. It is not likely that these "itinerant" specialists devote much, if any, time to the regular instructional activities of the building. Consequently, the number of specialties in the organization may not be an appropriate measure of complexity in an elementary school.

It certainly seems that an elementary school staff could not provide an appropriate environment which would account for the differences in children without a continual supply of relevant new information. Since most teachers have approximately the same amount of pre-entry preparation (four or five years in most cases), it seems reasonable to assume that an important source of new information into the organization would be through professional activities such as membership in organizations, attending conferences sponsored by professional organizations and special purpose workshops, and reading professional literature. While data concerning all of these professional activities were gathered in the questionnaire, exploratory analysis indicated that attendance at special purpose workshops had the strongest relationship with adaptiveness. In the final analysis, however, this indicator did not show a significant relationship to adaptiveness. A possible explanation for this lack of relationship becomes clear when one considers that length of training, including professional involvement as an indicator of complexity, is theoretically a function of the first measure of complexity, the number of specialties in the organization. In other words, obtaining information about the professional preparation and professional involvement may not be an adequate measure of complexity in an organization when there are only a few specialties to begin with.

On the basis of this study it should not be concluded that schools can improve their instructional programs, i.e., improve individualization procedures, without a continuing supply of new knowledge from outside the organization. Indeed, Carlson has shown that superintendents who are cosmopolitan, and who participate in professional activities outside their organization, are more likely to implement improved instructional programs.[2]

Even though there was a negative relationship between complexity as measured by the number of administrative positions and two measures of adaptiveness, it was not concluded that such a relationship did exist, for the reasons given. Moreover, while the data did not reveal that complexity as measured by attendance at special purpose workshops was related to adaptiveness, it was not concluded that the relationship did not exist. Rather, it was concluded that complexity as theoretically defined must be operationally defined for elementary schools in some manner other than was established for this study.

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[2] Richard O. Carlson, ADOPTION OF EDUCATIONAL INNOVATIONS (Eugene, Oregon: Center for the Advance Study of Educational Administration, 1965), p. 10.

Centralization and Adaptiveness

Centralization refers to the extent to which organizational members at different levels may participate in decision making and to the number of areas in which they may make decisions. The more that members at lower levels participate in many areas, the less centralized is the organization. When centralization is low, there are a greater variety of inputs and perspectives included in the decisions. Therefore, adaptiveness should be higher. The theory stipulates two measures of centralization: the number of members who can participate and the number of areas in which they participate. In this study only the latter measure was utilized since an elementary school has only two kinds of members that may participate.

Contrary to the theory, centralization was found to be positively, rather than negatively, related to all measures of adaptiveness, although significantly related only for two. The data provided no clues as to why centralization was positively rather than inversely related to adaptiveness. The centralization scores for each of the 38 schools did indicate, however, that the schools as a group were quite centralized. In other words, teachers felt that they "seldom" participated in decisions relative to such matters as budget, recommendations for new curricular and instructional programs, hiring of new staff, and selection of materials to be used in the classroom.

Research reported by Hage and Aiken indicated that decisions related to control of organizational resources were associated more closely with adaptiveness than was the right to make less important decisions.[3] On the basis of the theory and past research, the items for this subscale dealt with control of organizational resources including staff, money, materials, facilities, and work assignments. The adaptiveness subscale dealt with instructional matters which, even though instruction consumes organizational resources, are not directly related to decisions about organizational resources. It is conceivable that a measure of decisions related to instructional concerns would have yielded different results. One also suspects that teachers do not expect to be involved in decisions about organizational resources. There is little in their professional preparation that would equip them to be involved in such matters. In addition, administrators probably do not expect teachers to participate in such decisions. Assuming these speculations are accurate, then one possible explanation for the findings is that since teachers neither expect nor are expected to be involved in decisions about organizational resources, at least to a great degree, involvement in such decisions may drain time and energy from direct involvement in instructional activities. Therefore, given the measures of adaptiveness as used in this study, the less teacher time and energy is devoted to non-instructional decisions, the more adaptive the elementary school.

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[3] Jerald Hage and Michael Aiken, "Program Change and Organizational Properties: A Comparative Analysis," THE AMERICAN JOURNAL OF SOCIOLOGY, 8 (March, 1967), p. 512.

No conclusions were drawn about the apparent discrepancy between the theory and the findings of this study, except that the findings of this study did not support the theory.

Formalization and Adaptiveness

Formalization is related to the degree to which jobs or positions are codified and the degree to which members have latitude within the rules defining jobs. When jobs are highly codified and there is little latitude given to organizational members, there is little room or allowance for formulating and implementing new and better ways of performing on the job. Thus, the higher the formalization, the lower the adaptiveness.

There are two indicators of formalization. One measure is the number of jobs that are codified and the other is the range of variation tolerated within the rules. Because the organization of the elementary school typically is a relatively flat, with only two, or perhaps three, types of jobs, measuring the number of jobs that are codified is an inadequate measure. Therefore, in this study the formalization subscale dealt with the second indicator, the amount of pressure teachers perceived to conform to rules in the building.

On the basis of the findings in this study, it was concluded that there was no significant relationship between formalization and adaptiveness. The relationship that was observed, however, was in the direction suggested by the theory.

One possible explanation for this lack of relationship is that behavior considered to be appropriate for teachers does not need to be explicitly codified. Teachers enter the profession after four or five years of professional preparation during which time they are socialized with regard to their professional behavior. On the assumption that teachers already have the appropriate "built-in" behaviors, administrators do not feel a need to be explicit in defining rules and procedures. Deviants can be handled on an individual basis. In this context, rules about their own behavior are not at a very conscious level for teachers and may not have any affect on their adaptive behavior.

Interestingly, the relationship between formalization was only slightly less (.0553) than significant when related to adaptiveness measured by teacher activities. This finding suggests that with regard to adaptive behaviors engaged in by teachers when they attempt to respond to the differing characteristics of children, discretion and latitude in rule keeping increases the likelihood of such behavior.

Stratification and Adaptiveness

Stratification refers to the distribution of rewards to positions or jobs in an organization. These rewards may be earned formally or informally. In either case, rewards work to create status and prestige differences between jobs. Such differences have a tendency to create a block in communications. A suggestion from a subordinate is often an implicit criticism of the persons in higher positions, and since the rewards are often desirable, there is a likelihood that a person will not communicate information which will reduce the possibility of receiving the rewards. Thus, the higher the stratification, the lower the adaptiveness.

Once more, the relatively flat organization of the elementary school obviated the measuring of differences in prestige among different jobs and measuring the rate of mobility between status levels. On the assumption that status differences and prestige operate even in the absence of formal job differences, the stratification subscale was designed to measure an informal "pecking order" among teachers in an elementary school. On the basis of the findings which showed that stratification is negatively related to adaptiveness, it was concluded that there was an informal status system and that it did affect adaptiveness.

Job Satisfaction and Adaptiveness

Morale and job satisfaction are generally equated and refer to the humanizing aspect of an organization. Satisfied employees are generally motivated and involved in their work. Because they feel secure, satisfied employees are more receptive to new ideas and are likely to be willing to try new ideas suggested by others. There are two measures of adaptiveness: instrumental job satisfaction and expressive job satisfaction. The former refers to satisfaction with the work itself and the conditions of the job. The latter deals with satisfaction with social relations with peers and superordinates.

While job satisfaction is considered to be positively related to adaptiveness for reasons already given, it is possible that instrumental job satisfaction and expressive job satisfaction may work contrary to each other. If a peer or superordinate person suggests a new procedure or idea, it may result in more work for others, thus causing resentment toward the initiator of the new idea. One can anticipate that any innovation will be disruptive for the period of time it takes to become part of the routine operations. It is conceivable that protecting social relations may be more important than introducing a new program or technique. Thus, while high instrumental job satisfaction may result in increased willingness to innovate and be positively related to adaptiveness, high expressive job satisfaction may result in suppression of innovation.

The findings of this study indicated that there was no statistically significant relationship between either type of job satisfaction and adaptiveness. The relationship which did exist between expressive job satisfaction and adaptiveness was positive rather than negative. One explanation for the finding of no relationship between satisfaction and adaptiveness is that teachers in the sample schools were neither "very satisfied" nor "very dissatisfied." The mean scores were 28.40 and 14.64 for instrumental and expressive job satisfaction, respectively. These scores indicated that the schools were quite close to "satisfied" on the subscale. Given this generally satisfied condition, neither instrumental nor expressive satisfaction had any significant effect on adaptiveness. It was concluded, therefore, that when school staffs are "satisfied," job satisfaction has no effect on adaptiveness.

Comparison Between MUS-E Schools and Non-MUS-E Schools

No hypotheses were posed concerning the comparison of the two types of schools. The study simply provided an opportunity to compare the two types of schools on structural dimensions to see if there were differences when structures are considered in terms of abstract constructs theorized to be applicable to any kind of organizaion, regardless of how the organizations might appear on an organizational chart. The findings show that there were significant differences between the two types on all three measures of adaptiveness. In short, MUS-E schools were found to be significantly less centralized and significantly more adaptive.

The difference between the two types of schools on the centralization variable is explainable when differences in decision-making patterns in the two types of schools are considered. Teachers and principals in MUS-E schools are organized into two decision-making groups.[4] Teachers are organized into units, or teams, which are responsible for instructional decisions as well as for utilization of resources under the direct control of the unit. Unit leaders, or team leaders, meet on a regular basis with the principal in the Instructional Improvement Committee which is essentially responsible for building-wide decisions related to overall instructional activities and use of organizational resources. It is reasonable to assume that as the members of the staff in an MUS-E school consider instructional matters, they must give some thought to the utilization of organizational resources which are consumed in the instructional process. In the collegial setting of the MUS-E, teachers have an opportunity to be more involved in decisions about organizational resources. In contrast, in schools organized into age-graded, self-contained classrooms, the teachers do not have to share their resources, nor do they have regularly scheduled meetings for instructional planning. As a result, they communicate their needs to the building principal who is the only person who has any idea of total building needs and who can coordinate the securing and use of organizational resources.

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[4] Herbert J. Klausmeier, Mary R. Quilling, Juanita S. Sorenson, Russell S. Way, and George R. Glasrud, INDIVIDUALLY GUIDED EDUCATION AND THE MULTIUNIT ELEMENTARY SCHOOL: GUIDELINES FOR IMPLEMENTATION (Madison, Wisconsin: University of Wisconsin, Wisconsin Research and Development Center for Cognitive Learning, 1971), pp. 20-22.

The finding that MUS-E schools were more adaptive and yet less centralized than non-MUS-E schools appears to contradict the finding that centralization was positively related to adaptiveness. This paradox is explainable in the light of data which indicated that the variable MUS-E was related to adaptiveness. The variable MUS-E was the first variable entered in each of the three stepwise regression equations (one for each measure of adaptiveness). In other words, the data indicated that some condition in addition to the structural variables, is operating in MUS-E schools and results in their being more adaptive. There were no data which would indicate what such a variable or variables might be. If this be the case, then whatever the condition, it was sufficiently powerful to overcome the condition of less centralization in MUS-E schools. While the difference between the two types of schools was statistically significant, in absolute terms the point spread on the means for the two groups was only about 3 points. Moreover, the means for each type of school were very close to the "seldom participate in such decisions" category. Thus, while there was a statistically significant difference, the difference may be of little practical significance in terms of its effect on adaptiveness.

Clearly the MUS-E schools were more adaptive than non-MUS-E schools. The data indicated that while the variables of concern to the study were related to adaptiveness, some relationships were statistically significant and some were not. The findings also showed that structurally the two types of schools were substantially the same with the exception of the variable centralization. Apparently, the relatively lower centralization in MUS-E schools did not explain the higher adaptiveness in MUS-E schools. Accordingly, it was concluded that some factor intrinsic to the MUS-E type of organization which was not explained by the structural variables contributed to the higher adaptiveness of MUS-E schools in this sample.

Implications

This study possesses implications for theory, research and practice.

Theory

This study focused primarily on six variables in Hage's axiomatic theory of organizations. Four of these variables, complexity, centralization, formalization, and stratification, were termed means by Hage and in this study were termed organizational structures. In Hage's terms, two of the variables, job satisfaction and adaptiveness, were ends or performance variables. In this study job satisfaction was treated as an independent variable representing the human dimension of organizations and adaptiveness was treated as the dependent variable. Organizational structures were found to be related to organizational adaptiveness. While some of the relationships were not at the prescribed level of statistical significance, the significance of the relationships in this study were sufficient to warrant the conclusion that the theory is useful for understanding the dynamics of organizations and for predicting the innovativeness of organizations including elementary schools.

While the study did indicate the viability of the axiomatic theory at an abstract level, there was evidence that operational definitions of the variables need to be varied according to the hierarchy or differentiation of roles in the organization, proportion of professional positions, and the nature of the program(s) of the organizations under study.

Relative to industrial, business, welfare, and medical (hospitals in particular) organizations, the typical elementary school is characterized by a low or short hierarchy, is comprised primarily of professional positions, and its programs are not likely to increase in number (schools do not typically add reading programs, for example, to their offerings, but rather replace programs with presumably improved ones). Because these kinds of differences exist among organizations, it will be necessary to identify the underlying assumptions that Hage used in developing the measures for each of the variables in the axiomatic theory of organizations. The following discussion is related primarily toward the four structural variables.

Complexity. According to Hage, complexity has two measures. One is the number of social positions or specialties in an organization and the other is the amount of training for the specialty.[5] Other theorists, Pugh, et al.,[6] and Price,[7] for example, use the terms specialization or division of labor in reference to the same basic concept. Essentially what these terms refer to is the extensiveness and intensity of knowledge in the organization. In other words, the assumptions underlying the construct of complexity is the knowledge base or structure in an organization.[8] Considered in this light, an operational definition of complexity must be derived on the basis of how knowledge is accumulated in an organization. There was strong evidence (thought not statistically significant) in this study that the number of special purpose workshops attended in a year is a viable means of differentiating between adaptive and non-adaptive elementary schools.

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[5] Hage, op. cit., p. 294.

[6] D. S. Pugh, et al., "A Conceptual Scheme for Organizational Analysis," ADMINISTRATIVE SCIENCE QUARTERLY, 8 (December, 1963), p. 301.

[7] James L. Price, Organizational Effectiveness: An Inventory of Propositions (Homewood, Illinois: Richard D. Irwin, Inc., 1968), p. 26.

[8] Jerald Hage and Michael Aiken, SOCIAL CHANGE IN COMPLEX ORGANIZATIONS (New York: Random House, 1970), p. 33.

Centralization. Hage theorized that centralization is measured by the proportion of occupations or jobs whose occupants participate in decision making and the number of areas in which they participate.[9] Moreover, such decision making is in reference to the allocation of organizational resources. Clearly Hage is referring to power to make decisions that the organization considers to be in some sense important such as the employment or dismissal of staff or budget formulation with its concommitant policy implications. In essence, Hall agrees with Hage.[10] If the operational definition for centralization is derived from the underlying assumption about power then one needs to give careful consideration about where the greatest power actually resides. In this study, the measure of centralization dealt with matters traditionally considered to be "important," and the relationship to adaptiveness was found to be significant but in a direction opposite to that specified in the theory. In other words, the less teachers are involved in such areas of decision making, the more adaptive the school. Earlier in this chapter the argument was made that decision making about organizational resources may detract from time needed for instructional decision making and that teachers do not expect nor are expected to be involved in such kinds of decision making. It may also be that instructional decisions about the kinds of student activities, teacher activities, and the use of instructional materials which in the long run consume organizational resources, is where the actual power or leverage lies rather than in direct decisions about organizational resources. The application of power is a two-way proposition, and developing an operational definition of centralization depends on the correct identification of the locus of power.

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[9] Hage, op. cit., p. 295.

[10] Richard H. Hall, ORGANIZATIONS: STRUCTURE AND PROCESSES (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1972), p. 117.

Formalization. This variable is measured, according to Hage, by the proportion of codified jobs and the range of variation that is tolerated within the rules defining the jobs.[11] Other students of organizations have referred to the concept of formalization as standardization.[12] Regardless of the terms employed, the important notion is that the behavior of organizational members is regulated and coordinated in order to assure that organizational activities are carried out and to assure predictability and thus assure efficient coordination. The underlying concern with formalization is the matter of member behavior which contributes to smooth operation of the organization. However, "correct" member behavior does not have to be a function of rule making or enforcing. It may be, and among professionals is likely to be, a function rather of member socialization during periods of pre-professional preparation and peer pressure to conform to certain understood, but unwritten, ethical standards. In other words, in organizations which employ a high proportion of professionals, jobs may not be highly codified in terms of written job descriptions and yet such organizations may be highly formalized as a function of the socialization of the members and peer pressures. Operational definitions of formalization must take into account the means by which the behaviors of organizational members are described and regulated. It was clear in this study that specific rules did have a negative (but not significant) relationship to adaptiveness, particularly with regard to teacher activities related to individualization practices. Had the measure of formalization dealt also with matters pertaining to professional standards of conduct, a closer relationship with adaptiveness may have been found.

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[11] Hage, op. cit., p. 295.

[12] D. S. Pugh, et al., "Dimensions of Organizational Structure," ADMINISTRATIVE SCIENCE QUARTERLY, 13 (June, 1969), 1, p. 75.

Stratification. As proposed by Hage, stratification is measured by determining the difference in rewards between jobs and the relative rates of mobility between jobs.[13] Differences can be quite formal and obvious through such mechanisms as promotions and merit increases in salary; they can also be quite informal and subtle through such means as appointments to committees, first choice of materials, or some persons being treated as a confidante.[14] In either event, some kinds of rewards are differentially distributed to persons either by virtue of their position or as a result of preferential treatment, regardless of position, and access to such rewards in either situation may be closed or open. In deriving an operational definition of stratification, then, it is most helpful to identify what kinds of rewards, which can be distributed differentially, are available in an organization. In this study, such an approach was taken and the variable stratification was significantly related to adaptiveness in the direction suggested by Hage.

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[13] Hage, op. cit., p. 295.

[14] Hage and Aiken, op. cit., p. 45.

This study, in summary, found that while the original propositions, or axioms and related corallary statements, of Hage's axiomatic theory of organizations are useful ways of conceptualizing organizational structures and describing their dynamic relationships, considerable thought must be given to the operational definitions of the variables. If the operational definitions suggested by Hage were to be adhered to strictly, it would be difficult to conduct comparative research between different types of organizations using the axiomatic theory as a framework.

Finally, with regard to the construct of adaptiveness, it is clear that structural variables are related to organizational adaptiveness. But only a portion of the variance is accounted for by organizational structures. A complete theory of organizational adaptiveness must also account for the interactions of social-psychological and psychological variables. Combining all three perspectives in one model would, of course, be a substantial conceptual task.

Research

The finding that centralization was positively rather than negatively related to adaptiveness poses an interesting research question. What is there in the way that an elementary school is organized that would yield this finding? In part, it may be the relative flatness of the organization. It may also be due to the way teachers and administrators are professionally prepared for their respective positions. Another reason may be that the area of decision making, organizational resources vis a vis instructional matters, affect the direction of the relationship.

Not only should there be further thought given to more appropriate operational definitions (a theoretical or conceptual problem) but also to deriving more sensitive measures of such definitions. In an organization such as the school, where there is little difference among positions in terms of professional preparation, a more senstive measure of the extensiveness and intensiveness of knowledge in the organization needs to be developed, to mention only an example.

Now that there is evidence that MUS-E schools are more adaptive with regard to meeting the different characteristics of children even though structurally they are very similar to non-MUS-E schools, investigations are needed to identify the factor or factors that contributed to this result. There is little question but that both professionals and laymen are desirous of providing better instruction for children. It would seem that certain structural characteristics need to be operating in varying degrees and in different directions, but something else is also contributing to improved instructional practices. When this can be identified, then a more complete set of recommendations can be provided or improved models of staff organization can be developed.

Practice

Educators at all levels are desirous of improving educational practices, of formulating programs which are more responsive to the individual characteristics of children. It is reasonable to assume that organizational structures can either limit or enhance the development of such programs. Indeed this study has demonstrated that structures do have such an effect. In practical terms, several recommendations can be offered to the central office staff of school systems, building principals, and to teachers:

1. It is important that as instructional programs are devised for children, knowledge from a number of perspectives be applied in the decision making process. In other words, an organization should remain relatively permeable to new and useful information. Operationally, this condition can be realized in three ways. First, schools should involve a number of specialties besides teachers in the decision making about instructional programs. In effect, this means broadening the typical role of the school psychologist, social worker, guidance counselor, and others beyond that of dealing only with problem children so that the knowledge they represent can be an integral part of the information used in making instructional decisions. Second, opportunities should be given staff to participate in special purpose workshops. While there is some value to be gained from reading professional literature

and participating in conventions sponsored by professional associations, special purpose workshops provide more focused knowledge and skills which can be utilized in specific situations. Third, locally developed individualization practices should be more carefully evaluated and researched so that these can be made more valid and reliable when used by other teachers. All three means of providing information to instructional decision making will increase the complexity of the school as an organization and thus contribute to its adaptiveness.

2. The role of the instructional staff with regard to making direct decisions about the allocation of organizational resources has negative consequences for organizational adaptiveness. Teachers may not expect or wish to be involved in such decisions since involvement may take valuable time away from instructional planning. Moreover, once instructional programs are planned and approved, the allocation of funds, personnel, and materials follow. Therefore, the involvement of staff in instructional programing is important if school system officers wish to have adaptive schools. It may be that

financial realities preclude implementation of all the plans. In such a case, however, it would still be important to involve teachers and other staff in the reformulation of plans. Planning, of course, can be effective only if it is a continuous process so that changes can be made as new information is brought to bear. In other words, instructional programs need to be self-correcting on the basis of experience. This suggests that staff need to be organized in such a way that collaborative planning on a regular basis is possible, not only for long range planning, but also for short range planning. The Multiunit School-Elementary is a good model of such planning arrangements.

3. Because schools are comprised primarily of professional personnel, there appears to be little need for highly codified job descriptions. Ethics or standards of conduct are "built into" the professional educator during pre-professional preparation and peer pressures, administrator expectations, and community expectations serve to a large degree to enforce these standards. Exceptions are handled, by and large, on an individual basis. In terms of written rules and regulations, there is a great deal of latitude and discretion for teachers. This

latitude, however, is controlled to some unknown extent, by norms and expectations. In addition, it may be that teachers are not very concerned about written rules. A rule relative to reporting pupil progress, for example, may be quite acceptable and not perceived as restrictive if it is justified in terms of its value for maintaining good relations with parents. What is probably more problematic for teachers is that certain activities may run counter to community, administrator, or peer expectations about "good teaching." It is suggested, therefore, that educators at all levels make an effort to be conscious of these expectations when innovations and changes are planned and implemented. One technique for obviating any possible conflict is to initiate new activities on a pilot basis. Another is to provide adequate information to the various publics prior to implementation of the change. Either approach serves to legitimize the change and make it acceptable. However, if such procedures become too burdensome, then teachers will be less likely to propose changes.

4. As a general rule, elementary schools do not have a great number of formal rewards that can be differentially distributed. That is, there are no promotions

in rank or position, private offices to which some teachers can be assigned, or merit salary increases. There are, however, informal and sometimes quite subtle rewards that can be and are used to create an informal status system. Some teachers have first choice of new materials, or are assigned to important committees, or are treated as confidants. If these are distributed only to a select number of teachers, stratification will increase and adaptiveness will decrease. Administrators should make every effort to assess the kinds of informal rewards that are considered important to the teachers and then distribute these rewards in such a way that no one teacher or group of teachers is perceived to have higher status or prestige than other teachers.

5. One of the more important immediate practical implications of this study is that the MUS-E type of school organization is likely to be more adaptive and more responsive to the differing characteristics of children than a non-MUS-E school. Here is an organizational pattern that has been developed and is in operation in many schools around the country. It is

a viable alternative to the age-graded, self-contained type of classroom organization. The implementation of the MUS-E requires a rather intensive staff development activity for principals and prospective unit leaders.[15] During these inservice sessions, the participants are expected to learn about both the characteristics of the MUS-E organization and about a framework for instructional decision making called the Instructional Programing Model. The model helps the participants to give conscious attention to the identification of different characteristics among children and to the specific activities of both teachers and students in response to these varying characteristics. The higher mean scores of MUS-E schools on adaptiveness (measured as student activities and measured as teacher activities) indicate that the staff development activities are successful in two regards. First, staff in MUS-E schools are carrying out more adaptive student and teacher activities than are staff in non-MUS-E schools. Second, principals and unit leaders, the only ones to receive the staff development inservice, are communicating these concerns to teachers.

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[15] Klausmeier, et al., op. cit., Chapter V.

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APPENDIX A

the
Wisconsin
Research and Development Center
for Cognitive
Learning

the University of Wisconsin · 1025 West Johnson Street · Madison, Wisconsin 53706 · (608)262 - 4901

January, 1973

Dear

I want to thank you for agreeing to participate in this study. I have enclosed a questionnaire for you to fill out, and I have enclosed 10 questionnaires to be given to 10 of your teachers.

It is important for you to give these to the teachers that I have identified. Based on the list of teachers in your building, which you provided us, I have randomly selected the 10 identified teachers. To keep my random sampling pure, it is important for you to give these to the identified teachers. Each copy of the teacher's form of the questionnaire has an envelope attached with the teacher's name on it. Instruct the teachers that it will take about 30 minutes to complete the questionnaire. When they have finished the questionnaire, they are to fold it and seal it in the envelope. They should return the envelope to you. When you have collected all 10 envelopes, enclose them in the jiffy bag which we have provided you. In turn, put that jiffy bag inside the business reply envelope which we have also provided.

Again, thank you very much for agreeing to participate in this study. It would be helpful if you could return these questionnaires to me within ten days after you have received them.

Sincerely yours,

James E. Walter

James E. Walter
Project Coordinator

JEW/mz
Enclosures

ELEMENTARY SCHOOL STRUCTURE SURVEY

(Principal's Form)

James E. Walter

EXPERIMENTAL COPY

You are participating in a study sponsored by the Wisconsin Research and Development Center for Cognitive Learning and the University of Wisconsin-Madison Department of Educational Administration. Its purpose is to determine the variables which are important in contributing to a school's adaptiveness. As you consider each of the questions in the following survey, think and respond from the viewpoint of your present position. All responses will remain confidential and none will be identified by person.

When you have completed the survey, seal it in the enclosed envelope and return it with the surveys from the other staff members in your building.

Published by the Wisconsin Research and Development Center for Cognitive Learning, supported in part as a research and development center by funds from the United States Office of Education, Department of Health, Education and Welfare. The opinions expressed herein do not necessarily reflect the position of the Office of Education and no official endorsement by the Office of Education should be inferred.

BACKGROUND INFORMATION

1. Name of your school: ____

2. City in which your school is located: ______________________________

3. Sex: _____ male; _____ female

4. Age: ______

5. For how many years (at the end of this school year) have you been a principal? ______

6. How many of these years have been in your present position? ______

COMPLEXITY

Below is a list of occupational specialties which might be found in an elementary school. Place a check mark after the occupational specialties which are found in your school building and which have qualified people working in the specialty at least 10 hours per week.

District, CESA, and county personnel may also be counted provided they meet the above criteria.

Administrative Staff

Principal ______
Assistant Principal ______
Director of Elementary Education ______
Supervisor (Curriculum and/or Instruction) ______
Administrative Intern ______
Other (Specify) ______

Teaching Staff

Unit or Team Leader ______
Classroom Teacher ______
Librarian ______
Physical Education ______
Music ______
Art ______
Special Education ______
Physical or Mental Retardation Teacher ______
Teacher Intern ______
Practice Teacher ______
Substitute Teacher ______
Instructional Aide ______
Other (Specify) ______

Pupil Personnel Staff

Guidance Counselor ______
School Psychologist ______
Social Worker ______
School Nurse ______
Speech Therapist ______
Special Learning Disabilities ______
Attendance Officer ______
Remedial Reading ______
Remedial Math ______
Other (Specify) ______

Auxiliary Staff

School Secretary ______
Teacher Secretary or Clerical Aide ______
Lay Supervisor (Lunchroom, Playground, Library, etc.) ______
Volunteer Mother ______
Custodian ______
Cook ______
Bus Driver ______
Audiovisual ______
Other (Specify) ______

APPENDIX B

the
Wisconsin
Research and Development Center
for Cognitive
Learning

the University of Wisconsin 1025 West Johnson Street · Madison, Wisconsin 53706 (608)262-4901

January, 1973

TO THE TEACHER:

I want to thank you for agreeing to participate in the research that I am conducting on the Multiunit School-Elementary. Your cooperation will help us better determine what kinds of organizational structures are better suited to providing better educational programs to individual children.

The questionnaire will take about 30 minutes to complete. When you have completed the questionnaire, enclose it in the attached envelope and seal the envelope. Then return the questionnaire to your principal. In turn, he will forward to me all of the questionnaires that were provided to your building.

Again, I wish to thank you for participating in this study. I have asked the principal to return the questionnaire within ten days of receiving them. Your cooperation in returning the questionnaires promptly will be very helpful.

Sincerely yours,

James E. Walter

James E. Walter
Project Coordinator

JEW/mz
Enclosure

ELEMENTARY SCHOOL STRUCTURE SURVEY

(Teacher's Form)

James E. Walter

EXPERIMENTAL COPY

You are participating in a study sponsored by the Wisconsin Research and Development Center for Cognitive Learning and the University of Wisconsin-Madison Department of Educational Administration. Its purpose is to determine the variables which are important in contributing to a school's adaptiveness. As you consider each of the questions on the following instrument, think and respond from the viewpoint of your present position. All responses will remain confidential and none will be identified by person.

When you have completed the instrument, seal it in the enclosed envelope and return it to your school's principal.

Published by the Wisconsin Research and Development Center for Cognitive Learning, supported in part as a research and development center by funds from the United States Office of Education, Department of Health, Education and Welfare. The opinions expressed herein do not necessarily reflect the position of the Office of Education and no official endorsement by the Office of Education should be inferred.

BACKGROUND INFORMATION

1. Name of your school:____

2. City in which your school is located:______________________________________

3. Sex:______male; ______female

4. Age:_______

5. For how many years (at the end of this school year) have you been a teacher?______

6. How many of these years have been in your present position?_________________

COMPLEXITY

7. How much formal professional preparation have you had?
   a. Do you have a bachelor's degree? yes______ no______
   b. How many credits beyond the bachelor's degree have you earned?__________
   c. Have you earned a master's degree? yes______ no______
   d. How many credits beyond the master's degree have you earned?____________

8. On the average, how many special purpose institutes or workshops do you attend a year? ______

9. Of how many professional organizations are you a member? __________________

10. How many meetings of professional organizations do you attend each year on the average? ________

11. How many professional journals do you subscribe to?________

CENTRALIZATION

Directions: Circle the most appropriate answer.

HOW FREQUENTLY DO YOU PARTICIPATE IN DECISIONS CONCERNING . . .

	Almost Always	Often	Sometimes	Seldom	Almost Never
12. the hiring of new staff members for the school?	1	2	3	4	5
13. the development of the school budget?	1	2	3	4	5
14. recommendations for the adoption of new curricular or instructional programs?	1	2	3	4	5
15. work procedures to be followed by the school staff?	1	2	3	4	5
16. room assignments, allocation of aides, etc.?	1	2	3	4	5
17. school policy or philosophy?	1	2	3	4	5
18. the evaluation of other staff members?	1	2	3	4	5
19. recommendations for new school plans and facilities being planned?	1	2	3	4	5
20. your own work assignments?	1	2	3	4	5
21. how a specific job or task is to be handled?	1	2	3	4	5
22. the selection of materials to be used in the classroom?	1	2	3	4	5
23. the development of the pupil progress reporting system?	1	2	3	4	5

FORMALIZATION

Directions: This section of the questionnaire has two parts. One part asks you to indicate (by a yes or no answer) whether certain specific rules and procedures exist in your building. The second part asks you to indicate (on a five point scale) the extent to which these are enforced in your building. Circle the answer you think is most appropriate to your situation.

In your school building are there rules and procedures related to the following matters?

24. Field trips Yes No

25. Special speakers Yes No

26. Complaints from parents Yes No

27. Report cards Yes No

28. Pupil promotion or retention Yes No

29. Pupil discipline Yes No

30. Teachers leaving the building during school hours Yes No

31. Submitting lesson plans in advance Yes No

32. Purchasing supplies and materials Yes No

33. Approval to try new techniques or materials Yes No

34. Pupil health and safety Yes No

35. Teacher monitoring of pupils during lunch hour and/or recess Yes No

To what extent do the following conditions exist in your building with regard to these rules?

	Definitely True				Definitely False
36. Teachers may exercise considerable discretion in adhering to these rules.	1	2	3	4	5
37. The rules are strictly enforced by the principal.	1	2	3	4	5

		Definitely True				Definitely False
38.	Other teachers expect me to conform to these rules.	1	2	3	4	5
39.	Professional actions and decisions are highly circumscribed by the rules.	1	2	3	4	5

STRATIFICATION

Directions: Circle the answer which best describes your feelings regarding each statement.

		Definitely True				Definitely False
SOME TEACHERS . . .						
40.	get first choice of instructional materials.	1	2	3	4	5
41.	are not required to follow the rules and procedures as closely as others.	1	2	3	4	5
42.	have more say regarding school policy.	1	2	3	4	5
43.	have more status than others.	1	2	3	4	5
44.	have a closer relationship with the administration.	1	2	3	4	5
45.	are more able to get what they want into the school budget.	1	2	3	4	5
46.	are more sought after and respected by parents and others.	1	2	3	4	5
47.	have more prestige than others.	1	2	3	4	5

JOB SATISFACTION

Directions: Please indicate your feelings of satisfaction or dissatisfaction with your situation. For each item please answer by circling the number in the column most accurately describing your feelings.

HOW SATISFIED ARE YOU WITH . . .	Very Satisfied	Quite Satisfied	Satisfied	Somewhat Dissatisfied	Very Dissatisfied
48. the school's physical facilities?	1	2	3	4	5
49. your present position when you consider it in light of what you expected to be doing as a teacher?	1	2	3	4	5
50. the availability of appropriate instructional materials and equipment?	1	2	3	4	5
51. the extent to which you influence the making of important school decisions?	1	2	3	4	5
52. the extent to which your job is interesting, involving, and motivating?	1	2	3	4	5
53. the way school policies and regulations are enforced?	1	2	3	4	5
54. the way your principal is able to get people to work well together?	1	2	3	4	5
55. the competence and leadership of your principal?	1	2	3	4	5
56. the extent to which you are able to see positive results from your efforts?	1	2	3	4	5
57. the praise you get from other teachers for good work?	1	2	3	4	5

HOW SATISFIED ARE YOU WITH . . .	Very Satisfied	Quite Satisfied	Satisfied	Somewhat Dissatisfied	Very Dissatisfied
58. the extent to which you and other teachers share many common interests?	1	2	3	4	5
59. the opportunities you have to interact socially with administrative personnel?	1	2	3	4	5
60. the extent to which you meet socially with other teachers after hours?	1	2	3	4	5
61. the personal relationships you have with other teachers during working hours?	1	2	3	4	5

ADAPTIVENESS

There is a substantial body of literature in education which suggests that as instructional programs are implemented, efforts ought to be made to adapt instructional programs to the needs of individual children. In other words, instructional programs should be individualized. As you plan and conduct the instructional programs for the children in your school or class, which of the following is likely to be used or is likely to occur? Circle the answer you feel to be the most accurate in your situation.

	Likely to Occur			Not Likely to Occur	
62. The amount of time a student spends learning an objective is determined by the teacher	1	2	3	4	5
63. Varying sizes of teacher-led pupil groups	1	2	3	4	5
64. Children are assessed before they are assigned to learning activities	1	2	3	4	5
65. Each child has a space for his personal storage and the major part of the learning area is organized for common use	1	2	3	4	5
66. When appropriate, children are allowed to set their own learning objectives	1	2	3	4	5
67. Each child must spend a fixed amount of time per week in each area of the curriculum	1	2	3	4	5
68. Children seldom lead other groups of children	1	2	3	4	5
69. Children must ask permission to move about the room	1	2	3	4	5

		Likely to Occur				Not Likely to Occur
70.	The amount of time that a child may spend learning an objective varies greatly among the children	1	2	3	4	5
71.	The location that children are involved in learning activities will vary according to the activity	1	2	3	4	5
72.	Visual devices (e.g., 8mm cartridges) are used	1	2	3	4	5
73.	Older children tutor younger children	1	2	3	4	5
74.	Children study independently	1	2	3	4	5
75.	Teaching is done by permitting students to do their own discovering	1	2	3	4	5
76.	The use of supplementary books (other than for leisure reading)	1	2	3	4	5
77.	Most children have opportunity to demonstrate their projects to other children	1	2	3	4	5
78.	Children are assessed to determine in what kind of situation they learn best	1	2	3	4	5
79.	Teachers direct all learning	1	2	3	4	5
80.	Audio devices (e.g., tape recorders) are used	1	2	3	4	5
81.	Pupils work cooperatively in learning teams	1	2	3	4	5
82.	Teaching is done by using the problem solving method	1	2	3	4	5
83.	Children are assessed to determine mastery of objectives	1	2	3	4	5
84.	Some space is available for tutoring situations	1	2	3	4	5
85.	A group of teachers share responsibility for teaching many students	1	2	3	4	5

	Likely to Occur			Not Likely to Occur	
86. When appropriate, students are involved in developing special curriculum projects	1	2	3	4	5
87. Audiovisual devices (e.g., audio-filmstrips) are used	1	2	3	4	5
88. The use of a single text or basal series	1	2	3	4	5
89. A group of teachers share responsibility for planning the instruction for many students	1	2	3	4	5
90. When appropriate children may choose how they will accomplish learning objectives	1	2	3	4	5
91. The teachers guide children in their learning	1	2	3	4	5
92. Children may choose to work on an independent project instead of attending a class	1	2	3	4	5
93. The teacher acts in a supportive role, providing assistance only when required or sought	1	2	3	4	5

APPENDIX C

DESCRIPTION AND ORGANIZATIONAL CHART OF A MULTIUNIT SCHOOL-ELEMENTARY (MUS-E)*

The multiunit school-elementary (see Figure 1) was designed to create an environment in which IGE practices can be installed and maintained. Differentiated staffing, group planning and decision making, open communication, and accountability characterize a multiunit school. These characteristics are made possible by three organizational/administrative groups with overlapping membership.

The I & R Unit

The nongraded instructional and research (I & R) unit replaced the age-graded, self-contained classroom. Research is included in the title to reflect the fact that the staff must continually do practical research in order to devise and evaluate an instructional program appropriate for each child. Each I & R unit has a unit leader, three or four staff teachers, one teacher aide, one instructional secretary, one intern, and 100-150 students. Children of a unit usually have a three-to four-year age span in contrast to traditional grades where children typically represent a two-year age span.

The main function of each unit is to plan, carry out, and evaluate each child's instructional program. Each unit engages in some inservice education. Some units plan and conduct research and development cooperatively with other agencies, and some are involved in preservice education.

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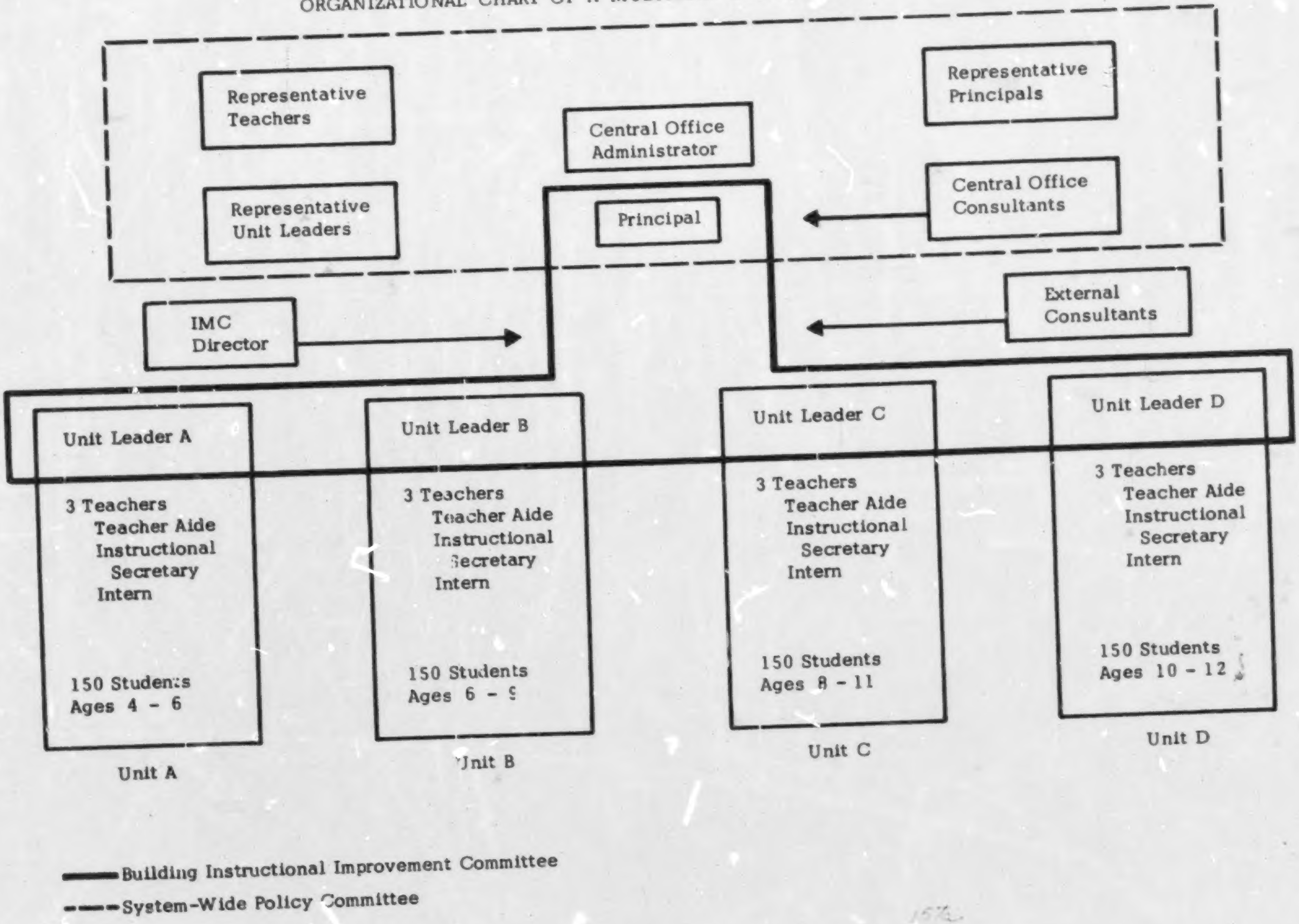
*Adapted from a brochure entitled Individually Guided Education in the Multiunit Elementary School, published by the Wisconsin Research and Development Center for Cognitive Learning, Madison, Wisconsin, 1971.

Figure 1

ORGANIZATIONAL CHART OF A MULTIUNIT SCHOOL OF 600 STUDENTS


Representative Teachers
Representative Unit Leaders
Central Office Administrator
Principal
Representative Principals
Central Office Consultants
External Consultants
IMC Director
Unit Leader A
3 Teachers
Teacher Aide
Instructional Secretary
Intern
150 Students
Ages 4 - 6
Unit A
Unit Leader B
3 Teachers
Teacher Aide
Instructional Secretary
Intern
150 Students
Ages 6 - 9
Unit B
Unit Leader C
3 Teachers
Teacher Aide
Instructional Secretary
Intern
150 Students
Ages 8 - 11
Unit C
Unit Leader D
3 Teachers
Teacher Aide
Instructional Secretary
Intern
150 Students
Ages 10 - 12
Unit D
Building Instructional Improvement Committee
System-Wide Policy Committee

The IIC

The instructional improvement committee (IIC) is at the second level of organization. It is building-wide in scope and is comprised of the principal and unit leaders.

The IIC takes primary initiative for stating the educational objectives and outlining the educational program for the entire school building. It interprets and implements systemwide and statewide policies, coordinates I & R unit activities, and arranges for the use of facilities, time, and material. The IIC deals primarily with developing and coordinating functions related to instruction.

The SPC

Substantial change is required to move from the self-contained classroom organization to the unit and the IIC. The systemwide policy committee (SPC) at the third organizational level can facilitate this transition. The SPC is chaired by the superintendent or his designee and includes consultants and other central office staff and representative principals, unit leaders, and teachers. The SPC takes initiative for identifying functions to be performed in each MUS-E of the district, recruiting personnel for each school and arranging for their inservice education, providing instructional materials, and disseminating relevant information within the district and community. A central office arrangement other than an SPC may be responsible for these functions; considerable flexibility is required since local school districts differ greatly in size.

The I & R unit, the IIC and the SPC provide for responsible participation in decision making by all the staff of a school system.

Each element, though being responsible for certain decisions, must secure information from one or both of the other elements. Personnel who serve at each of two levels provide the communication link (see Figure 1).

Differentiated Roles

Some differentiated staffing programs create a complex hierarchy and call for a proliferation of new roles and titles. The multiunit school establishes only one new position, the unit leader. The roles of the building principal, staff teacher, teacher intern, teacher aide, and instructional secretary are altered somewhat. Other specialized roles are not precluded. Essential roles are outlined below.

Principal

As instructional leader, the principal is primarily responsible for initiating and refining the IGE system, managing the preservice and inservice teacher education activities, and administering the research and development program. It is not assumed, however, that the principal is the expert in any subject field, in research design, or in teacher education. In many areas the unit leaders and staff teachers are expected to have more knowledge than the principal, therefore decisions are made collectively through the IIC. The principal is responsible, however, for organizing and chairing the IIC and for assuring implementation of its decisions. In addition, he supervises and evaluates staff and makes sure the building has adequate resources.

Unit Leader

The unit leader has responsibilities as a member of the IIC, as a leader of a unit, and as a teaching member of a unit. The unit leader is not a supervisor but a career teacher who plans and coordinates unit activities. He is responsible for demonstrating new materials and for keeping abreast of research and development. As a member of the IIC, he helps plan and develop the instructional program of the building and serves as a liaison between the unit staff and the principal and central office staff.

As unit coordinator, the leader is responsible to the principal for planning and implementing the unit's educational program. However, each teacher in the unit shares fully in decision making and takes initiative regarding the program of specific children. Unit meetings are held at least one hour a week (during school time), giving teachers an opportunity to pool their knowledge and expertise. They cooperatively plan, carry out, and evaluate an instructional program for each child.

Staff Teacher

A staff teacher plans the program for and guides many children in cooperation with other unit members. In contrast, a teacher in a self-contained classroom works independently with a small number of children. A higher level of professionalism is required by the staff teacher in implementing an IGE instructional system. Staff teachers cooperatively formulate objectives for each child, assess each child's progress, and use new materials, equipment, and instructional procedures.

For some, teaching in the unit may threaten loss of autonomy. In the environment of the MUS-E, teachers realize that joint planning and evaluating are vital to a more complete understanding of the teaching-learning process and to an effective IGE program.

Intern

The intern engages in professional activities, not in routine or clerical duties. At first he observes but moves rapidly to full responsibility at a level similar to that of a beginning certified teacher. While the unit leader and teachers retain decision-making responsibility, the intern does implement decisions and participates in unit meetings.

Instructional Secretary and Teacher Aide

Instructional secretaries and teacher aides are non-certified members of units. The wise use of their abilities is the responsibility of the unit leader in cooperation with the principal and unit staff. The instructional secretary performs clerical tasks such as keeping attendance records, duplicating materials, typing, and filing.

The precise responsibilities of teacher aides vary greatly, depending on the aide's background and training. For example, the aide with a college degree in a subject field such as science will perform functions different from the high school graduate with no work in science after ninth grade. In general with regard to IGE, teachers have found aides especially helpful with one-to-one, small group, and independent activities.

APPENDIX D

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MATRIX OF PEARSON PRODUCT MOMENT CORRELATIONS OF
ORGANIZATIONAL STRUCTURES AND ADAPTIVENESS

Variable Name and Number	1	2	3	4	5	6	7	8	9	10	11	13
1. Size	1.000											
2. Complexity (No. of Administrative Positions)	.247	1.000										
3. Complexity (No. of Special Purpose Workshops	-.007	-.014	1.000									
4. Centralization	-.215	-.108	.159	1.000								
5. Formalization	-.019	-.067	-.060	-.005	1.000							
6. Stratification	-.169	-.026	-.067	.119	-.086	1.000						
7. Instrumental Job Satisfaction	-.199	.214	.029	.141	-.305	.179	1.000					
8. Expressive Job Satisfaction	-.117	-.059	-.312	.155	.325	.181	.412	1.000				
9. Adaptiveness: Student Activities	-.317	-.351	.283	.459	-.068	-.249	.242	.123	1.000			
10. Adaptiveness: Teacher Activities	-.402	-.339	.196	.461	-.182	-.123	.257	.269	.690	1.000		
11. Adaptiveness: Individualization	-.372	-.373	.274	.495	-.114	-.223	.266	.185	.965	.855	1.000	
12. MUS-E	-.286	-.331	.093	.467	-.055	-.006	.184	.329	.473	.770	.617	1.000

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